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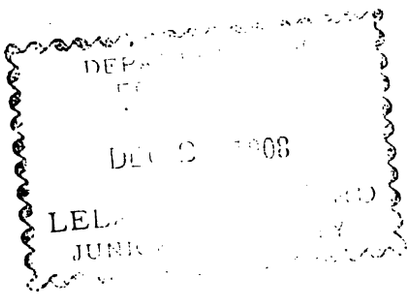

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SPECIAL REPORTS

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LETTER OF TRANSMITTAL.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF THE CENSUS,
Washington, D. C., June 22, 1908.

SIR:

I have the honor to transmit herewith a report containing the results of the census of transportation by water, which was taken in conformity with section 7 of the act of Congress of March 6, 1902, as amended by act of June 7, 1906. This report covers the calendar year ending December 31, 1906, and has been prepared under the supervision of Mr. William M. Steuart, chief statistician for manufactures.

The results of this census were published on March 16, 1908, in Census Bulletin 91, which constitutes the first section of this report. The other sections present the statistics in detail for the Atlantic coast and Gulf of Mexico, Pacific coast, the Great Lakes and St. Lawrence river, the Mississippi river and its tributaries, and canals and all other inland waters, respectively.

Representatives of a number of the principal shipping companies were consulted in regard to the scope of this census, and it was decided that it would be impossible to secure reliable statistics concerning cost of operating all of the craft necessarily included in the census. The schedule was designed principally to develop statistics which would show the magnitude of the water transportation interests on the coasts and inland waters of the United States, and it was believed that a simple schedule was best adapted for this purpose.

Very respectfully,

S. N. D. North
Director.

Hon. OSCAR S. STRAUS,
Secretary of Commerce and Labor.

32576—08——2

UNITED STATES

TRANSPORTATION BY WATER: 1906.

UNITED STATES.

SCOPE OF THE CENSUS.

This report presents statistics for the year ending December 31, 1906, for all American documented and undocumented vessels or craft of 5 tons net register or over. It therefore includes all craft of the required ownership and tonnage operated on the coasts and inland waters of the United States, Porto Rico, and the Hawaiian Islands, or between the ports of these and other countries. It also includes a few craft of American ownership that did not visit American ports during 1906, but does not include craft operating exclusively in the waters of the Philippine Islands, or between such waters and ports of foreign countries.

All classes of floating equipment were included except those owned by the Federal Government, those engaged in fishing, stationary wharf boats, and house boats used largely for residence purposes. Craft engaged in fishing were omitted because they form a part of the fishing industry of the country, and are to be included in the census of that industry which is provided for by section 7 of the act of Congress of March 6, 1902.

Vessels that were in operation during all or a portion of the year are classed as "active craft" as distinguished from those idle during the entire year. The statistics for these two classes are given separately.

While a census of water transportation should cover all classes of floating equipment, manifestly it would be impracticable, and of no economic value, to include rowboats, canoes, small sailboats, launches, etc.; 5 tons was therefore fixed as the minimum size of the craft to be included.

As a basis for the fieldwork the names of vessels together with the addresses of the managing owners of all documented craft were obtained from the records of the Bureau of Navigation, Department of Commerce and Labor, and those of the undocumented craft from the offices of the collectors and surveyors of customs. The entire country was divided into districts, and the agents were instructed to make a thorough canvass of their respective districts and, in addition to accounting for all the names on the lists, to make careful inquiry and secure reports for all other craft that should be included in the census.

The managing owners of a number of the craft of American ownership have no established office on land at which census data can be obtained, and as such craft move from port to port they frequently can not be reached through the mail. While the agents made every effort to secure reports for them, some were evidently omitted from the canvass; a few unimportant craft operating on small lakes, difficult of access, were also omitted. In the aggregate, however, these omissions were insignificant, and it is believed that the canvass was as thorough as possible under existing conditions.

Each managing owner was required to report the class of the craft operated, the gross and net tonnage, character of materials from which constructed, motive power, waters in which operated, terminal points of regular routes, commercial value of the craft and of the land property incident to its operation, gross income for the year, persons employed and amount paid in salaries and wages, number of passengers carried, and the quantity of the different varieties of freight shipped from and delivered at the principal ports. This section of the report contains a summary of the statistics for most of the features developed by the schedule, but the details for each division are presented in the separate sections.

In deference to the wishes of the shipowners, and in view of the fact that it was impracticable to obtain definite information concerning the operating expenses for all of the craft included in the census, no inquiries were made concerning expenses other than the amounts paid in salaries and wages. The primary object of the census, moreover, was to show the magnitude of the transportation interests on the different waters of the United States, and it was believed that this could be most readily accomplished by a simple schedule applicable to all classes of craft. The report contains, therefore, no information in regard to profits, cost of carrying passengers or freight, or other features depending upon statistics of expenditures.

COMPARISON WITH PRIOR CENSUSES.

When possible the statistics for 1906 have been compared with those for prior censuses. The census of 1880 contains statistics and general information for the "merchant steam marine" and also the approxi-

mate number, tonnage, and value of sailing vessels, canal boats, barges, and flat and wharf boats. The statistics were compiled largely from the records of the Register of the Treasury and of the offices of local United States inspectors, and from other official sources. No organized canvass of all classes of craft was made as in 1906 and, with the exception of those for steam vessels, the totals are so incomplete that they should not be placed in comparison with those for 1889[1] or 1906.

At the census of 1889 an attempt was made to secure reports from all classes of craft of over 5 tons burden, but it appears to have been difficult at that time to apply a uniform schedule and instructions to all sections of the country. For example, fishing vessels were included in the statistics for the Pacific coast, but were excluded from the totals for other sections of the country; pile drivers, sand dredges, sand boats, and fire boats were reported for some sections of the country but not for others. A considerable proportion of the craft included in the census of 1889 failed also to make report of income, employees, wages, passengers or freight, and estimates for these items were prepared in the Census Office. At the census of 1889 no attempt was made to secure information respecting vessel interests upon state waters, while at the census of 1906 all waters were covered.

While it is probable that a more thorough enumeration was made at the census of 1906 than at that of 1889, it is known that some craft were omitted from both censuses. The extent of these omissions can not be determined, but a comparison of the reports for the census of 1906 with the records of the Bureau of Navigation establishes the fact that the documented, enrolled, and licensed vessels omitted from the census of 1906 are of small tonnage and that their exclusion has no appreciable effect on the totals.

The report for the census of 1889 does not include returns for Alaska. In 1889 very little shipping was carried on entirely within Alaskan waters, and the majority of the craft operating between Alaska and ports in California, Washington, or Oregon were credited to the states and not to Alaska. Under these conditions, to show the increase, it is proper to compare the totals for the shipping on the Pacific coast including Alaska in 1906 with those for the Pacific coast in 1889.

The statistics for Porto Rico and the Hawaiian Islands were not included in the census of 1889; they are now presented separately and not included in the totals for the United States. The totals for 1889 and 1906 have been made further comparable by including as far as possible the same class of craft in each of the three groups shown in Table 1.

[1] The Eleventh Census of Transportation by Water, which is known as the census of 1890, covered the year ending December 31, 1889, and to avoid confusion is referred to in this report as the census of that year.

TABLE 1.—ALL VESSELS AND CRAFT: 1906 AND 1889.

[Vessels operating as connecting links in railroad systems did not uniformly report the tonnage of freight carried or income for the year. In addition to the craft reported in this table there were 1,762 vessels, with a gross tonnage of 179,326, reported as idle in 1906, and 1,490, with a gross tonnage of 233,639, reported as idle, untraceable, or lost prior to or during 1889.]

	TOTAL.			STEAM.[1]			SAIL.[2]			UNRIGGED.		
	1906	1889[3]	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels	37,321	30,485	22.4	9,927	5,603	77.2	7,131	7,945	[4]10.2	20,263	16,937	19.6
Gross tonnage	12,893,429	8,359,135	54.2	4,059,521	1,710,073	137.4	1,704,277	1,675,706	1.7	7,129,631	4,973,356	43.4
Value of vessels	$507,973,121	$206,992,352	145.4	$386,772,727	$131,567,427	194.0	$56,206,145	$53,192,972	5.7	$64,994,249	$22,231,953	192.3
Gross income	$294,854,532	[5]$161,994,066	82.0	$262,167,342	[5]$113,715,700	130.5	$32,687,190	$48,278,366	[4]32.3	([6])	([6])	.....
Number of employees[7]	140,929	[8]113,870	23.8	115,525	[8]70,347	64.2	25,404	43,523	[4]41.6	([6])	([6])	.....
Wages[7]	$71,636,521	[8]$41,482,812	72.7	$61,265,474	[8]$28,521,220	114.8	$10,371,047	$12,961,592	[4]20.0	([6])	([6])	.....
Number of passengers carried	366,825,663	198,992,438	84.3	366,800,748	198,992,438	84.3	24,915	.....	.....	([6])	([6])	.....
Freight carried, including harbor work (net tons)[9]	[10]265,545,804	129,851,658	104.5	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Includes all craft propelled by machinery.
[2] Includes schooner barges, scow schooners, etc.
[3] Includes 52 craft with a gross tonnage of 2,553, valued at $75,360, for which no report was made for income, employees, wages, number of passengers and freight carried.
[4] Decrease.
[5] Exclusive of income for canal boats.
[6] Included in statistics for steam vessels.
[7] Does not include employees or wages for yachts on the Atlantic coast in 1889.
[8] Exclusive of employees on canal boats.
[9] Statistics for freight not directly comparable; for explanation, see page 33.
[10] Includes 2,003,453 net tons of bunker coal.

SUMMARY OF STATISTICS.

The increase in the shipping interests of the country has been due to the increase in steam vessels and unrigged craft. During the period of seventeen years the tonnage and value of the steam vessels more than doubled and there were also large increases for the unrigged craft, but the tonnage and value of sailing vessels increased only 1.7 and 5.7 per cent, respectively, while a considerable decrease occurred in their number and in the extent of their operations.

From the report of the Bureau of Navigation it appears that there were 24,898 vessels, with a tonnage of 6,647,007, registered, enrolled, and licensed in the United States on June 30, 1906, exclusive of Porto Rico, Hawaii, and the Philippines. The census covers 19,586 documented, registered, enrolled, or licensed craft, of which 18,199, with 6,362,215 tonnage, were

in operation all or a portion of the year, and 1,387, with a tonnage of 131,138, were idle during the entire year. Of the remaining 5,312 documented craft, some were engaged in the fishing industry, others had been destroyed or abandoned, and still others could not be located by the agents of the Census Office.

Craft of all classes, whether active or idle, exclusive of vessels owned by the Federal Government, numbered 31,975 at the census of 1889 and had a combined tonnage of 8,592,774, while at the census of 1906 they numbered 39,083 and had a combined tonnage of 13,072,755. These figures represent an increase in number of 7,108, or 22.2 per cent, and an increase in tonnage of 4,479,981, or 52.1 per cent.

TABLE 2.—ALL VESSELS AND CRAFT, BY OCCUPATION, AND PER CENT IN EACH GROUP: 1906.

OCCUPATION.	VESSELS.		TONNAGE.		VALUE OF VESSELS.		GROSS INCOME.		EMPLOYEES.		WAGES.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Number.	Per cent.	Amount.	Per cent.
United States	37,321	100.0	12,893,429	100.0	$507,973,121	100.0	$294,854,532	100.0	140,929	100.0	$71,636,521	100.0
Commercial vessels	32,674	87.5	12,736,529	98.8	471,268,723	92.8	291,418,998	98.8	130,315	92.5	67,013,594	93.5
Freight and passenger	8,796	23.6	5,084,450	39.4	337,633,845	66.5	193,565,044	65.6	84,853	60.2	40,220,763	56.1
Ferryboats	536	1.4	261,073	2.0	29,578,380	5.8	17,291,073	5.9	4,519	3.2	3,537,180	4.9
Tugs and other towing vessels	3,079	8.3	261,375	2.0	39,062,249	7.7	43,943,328	14.9	20,870	14.8	12,494,685	17.4
Unrigged craft	20,263	54.3	7,129,631	55.3	64,994,249	12.8	[1] 36,619,553	12.4	[1] 20,073	14.2	[1] 10,760,966	15.0
Yachts	3,770	10.1	106,430	0.8	28,451,114	5.6	28,578	(2)	7,807	5.5	2,848,728	4.0
All other	877	2.3	50,470	0.4	8,253,284	1.6	3,406,956	1.2	2,807	2.0	1,774,199	2.5

[1] In many cases the income, employees, and wages for unrigged craft were not reported separately but were included in the reports for towing vessels.
[2] Less than one-tenth of 1 per cent.

The majority of the craft and by far the largest proportion of the tonnage are engaged directly or indirectly in the transportation of freight and passengers. This class of service is represented not only by the steam and sail freight and passenger vessels, but by ferries, towing vessels, and unrigged craft, designated in the above table as "commercial vessels;" their tonnage was 12,736,529, and represents 98.8 per cent of the total for all craft. While a large part of the American tonnage is identified with the movement of freight and passengers, only 8,796 steam and sail vessels were classed as "regular freight and passenger," and the tonnage of this class formed only 39.4 per cent of the total. But the commercial value and amount of business done by these vessels was of much greater relative importance, the percentage of value represented by them amounting to as much as 66.5 of the value of all craft. They earned 65.6 per cent of the gross income, gave employment to 60.2 per cent of the persons required to operate the 37,321 vessels and craft included in the census, and paid 56.1 per cent of the total wages.

DIAGRAM 1.—*Gross tonnage of all vessels, by classes: 1906 and 1889.*

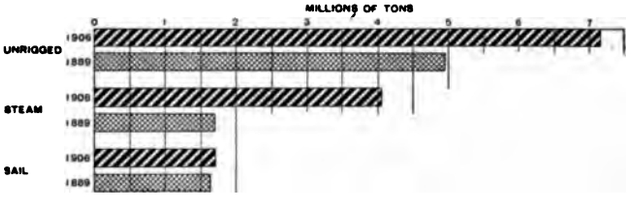
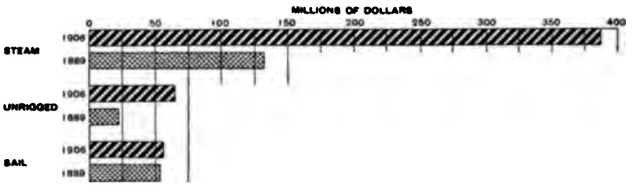


DIAGRAM 2.—*Value of all vessels, by classes: 1906 and 1889.*



The unrigged class represents more than half of the number and tonnage engaged in the freight movement, but their value forms a very much smaller proportion of the total. The group includes some dredges, pile drivers, and similar craft, the tonnage

of which, however, represents only a small proportion of the total tonnage of unrigged vessels.

UNDOCUMENTED CRAFT.

In analyzing the census data it is interesting to know the number and tonnage of undocumented craft included. Such information is given in Table 3.

TABLE 3.—*Number and gross tonnage of active and idle undocumented craft included in the census: 1906.*

CLASS.	Number of vessels.	Gross tonnage.
Aggregate	19,497	6,579,402
Active	19,122	6,531,214
Steam	1,250	46,705
Sail	533	5,355
Unrigged	17,339	6,479,154
Idle	375	48,188
Steam	107	7,689
Sail	33	559
Unrigged	235	39,940

The undocumented craft, consisting principally of yachts, harbor craft, canal boats, and barges operating on the rivers and other inland waters, form a considerable proportion of the number and tonnage of all vessels included in the census. As it is not compulsory for such craft to have documents, it is probable that the only official record concerning them is contained in the Census reports.

STEAM VESSELS.

The total for steam vessels includes all craft of every description propelled by steam, gasoline, electricity, or any motive power utilized by machinery; also craft equipped for propulsion by both machinery and sails. This includes vessels carrying freight, passengers, or both; tugs and towing vessels; towboats working with dredges, pile drivers, lighters, etc., and regular seagoing tugs; ferryboats which make regular or irregular trips between two designated points which are so close that the service is classed as "ferriage" rather than freight or passenger; and vessels operated for the pleasure of their owners and not for profit. In addition to these general classes the total includes steam vessels engaged primarily in taking out fishing parties, wreckers, pile drivers, dredges, dredge tenders, mail boats, news boats, pilot boats, floating grain elevators, dispatch boats, patrol boats, and other boats engaged in work incident to but not directly allied to the freight and passenger movement. The miscellaneous character of the craft included makes it necessary to classify the total as far as possible by the class of work in which the vessels were engaged during the census year, and this is done in Table 4.

TABLE 4.—*Steam vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	9,927	100.0	4,059,521	100.0	$386,772,727	100.0
Freight and passenger	3,615	36.4	3,411,588	84.0	286,218,089	74.0
Tugs and other towing vessels	3,079	31.0	261,375	6.4	39,062,249	10.1
Ferryboats	536	5.4	261,073	6.4	29,578,380	7.6
Yachts	2,176	21.9	82,275	2.0	24,281,861	6.3
All other	521	5.2	43,210	1.1	7,632,148	2.0

Of the 9,927 steam vessels included in the census of 1906 only a little more than one-third were regular freight and passenger steamers, but their tonnage formed 84 per cent of the gross tonnage and their value almost three-fourths of the total value reported for all steam craft. In consideration of the large quantities of freight moved by tugs and other towing vessels they should be accepted as a part of the freight equipment. By combining the two groups it is found that they represent more than 90 per cent of the gross tonnage and more than 84 per cent of the value of the entire fleet of steam vessels. The tonnage of the ferryboats is about equal to that of the tugs and other towing vessels, but they are a distinct class of craft, for which the statistics are shown separately in Table 14. While a large number of yachts were propelled by the use of machinery, their tonnage and value form but a small proportion of the total. The group of "all other" includes steam dredges, pile drivers, etc.

The dependence of the unrigged craft upon steam vessels for power and the consequent close relation between the two kinds of craft make it impossible to arrive at a satisfactory separation of the income, employees, and wages for the two classes, and therefore they are combined in Table 5, which is introduced to show the increase in the steam craft operating on the various waters of the United States.

TABLE 5.—STEAM VESSELS, BY DIVISIONS, WITH PER CENT OF INCREASE: 1906 AND 1889.

[The statistics of gross income, number of employees, and wages include the totals for unrigged craft.]

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.
Total	1906	9,927	4,059,521	$386,772,727	$262,167,342	115,525	$61,265,474
	1889	5,603	1,710,073	131,567,427	113,715,700	70,347	28,521,220
Per cent of increase		77.2	137.4	194.0	130.5	64.2	114.8
Atlantic coast and Gulf of Mexico	1906	5,413	1,457,894	193,926,327	139,717,909	58,470	31,664,945
	1889	2,536	741,770	65,518,640	57,034,216	[1] 30,528	[1] 13,284,325
Per cent of increase		113.4	96.5	196.0	145.0	91.5	138.4
Pacific coast (including Alaska)	1906	1,066	518,107	60,440,145	40,220,388	15,661	10,230,828
	1889	465	160,293	14,767,355	12,959,914	6,682	3,567,226
Per cent of increase		129.2	223.2	309.3	210.3	134.4	186.8
Great Lakes and St. Lawrence river	1906	1,676	1,915,786	116,983,812	60,933,528	22,658	12,318,174
	1889	1,467	595,813	40,868,824	27,223,207	16,968	6,294,188
Per cent of increase		14.2	221.5	186.2	123.8	33.5	95.7
Mississippi river and its tributaries	1906	1,435	146,227	13,196,770	17,342,038	15,016	5,692,117
	1889	972	192,974	9,622,608	16,331,872	15,951	5,337,185
Per cent of increase		47.6	[2] 24.2	37.1	6.2	[2] 5.9	6.7
All other inland waters	1906	337	21,507	2,225,673	3,953,479	3,720	1,359,410
	1889	163	19,223	790,000	166,491	218	38,296
Per cent of increase		106.7	11.9	181.7	([3])	([3])	([3])

[1] The employees and wages for yachts were not reported.
[2] Decrease.
[3] Income, number of employees, and wages were not reported for canal boats at the census of 1889, and therefore the percentage of increase is not given.

There has been a considerable increase in the number and magnitude of the operations of the steam craft on all waters except the Mississippi river and its tributaries, where the tonnage of the vessels and the number of persons employed have actually decreased. There has been an increase in the size of the steam vessels operating on the Great Lakes and the Pacific coast.

The greatest absolute increase, except in the gross tonnage, is shown for the vessels operating on the Atlantic coast and Gulf of Mexico; in tonnage the largest increase occurred on the Great Lakes, and is due principally to the large steel vessels recently constructed to carry grain and ore. There was also a large increase in the steam shipping on the Pacific coast, the percentages being larger than those for any of the other divisions. The increase in the income, employees, and wages for "all other inland waters" is due principally to the inclusion of the unrigged craft, for which it is probable a more thorough enumeration was made in 1906. But as no income, employees, or wages were reported for canal boats in 1889, the figures are not comparable and the percentages of increase are omitted.

The limitation of the census to vessels of 5 tons or over results in the exclusion of a large number of steam, gasoline, and electric launches engaged in the regular freight and passenger traffic on the lakes, bays, and rivers of the country. The number of these small vessels has increased very rapidly during recent years, and their aggregate annual business has now assumed considerable proportions.

The relative importance of the steam shipping in each of the five divisions at the censuses of 1889 and 1906 is shown in Table 6.

TABLE 6.—STEAM VESSELS, PER CENT IN EACH DIVISION: 1906 AND 1889.

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.
Total	1906	100.0	100.0	100.0	100.0	100.0	100.0
	1889	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic coast and Gulf of Mexico	1906	54.5	35.9	50.1	53.3	50.6	51.7
	1889	45.3	43.4	49.8	50.2	43.4	46.6
Pacific coast (including Alaska)	1906	10.7	12.8	15.6	15.3	13.6	16.7
	1889	8.3	9.4	11.2	11.4	9.5	12.5
Great Lakes and St. Lawrence river	1906	16.9	47.2	30.2	23.2	19.6	20.1
	1889	26.2	34.8	31.1	23.9	24.1	22.1
Mississippi river and its tributaries	1906	14.5	3.6	3.4	6.6	13.0	9.3
	1889	17.3	11.3	7.3	14.4	22.7	18.7
All other inland waters	1906	3.4	0.5	0.6	1.5	3.2	2.2
	1889	2.9	1.1	0.6	0.1	0.3	0.1

With the exception of tonnage, the relative importance of the steam vessels operating on the Atlantic and Gulf coasts has increased since 1889 until these craft now represent more than half of this class of American shipping. There has been also an increase in the relative importance of this class of vessels on

the Pacific coast, but the proportions for the Mississippi river and its tributaries have decreased. The steam vessels operating on other inland waters form such a small proportion of the total that changes in their relative importance are of slight significance. The tonnage of the steam vessels on the Great Lakes has increased much more rapidly than the number and is now in excess of that for the Atlantic and Gulf coasts, but the value and volume of business, as measured by the income, employees, and wages, were much less than on the Atlantic coast.

UNRIGGED CRAFT.

This class includes all craft that have no motive power of their own—all, in fact, that can not be classed as either steam or sail, such as barges, flatboats, lighters, scows, dredges, derricks, hoisting barges, floating elevators, and also canal boats, irrespective of the waters in which they were operated during 1906. The number and tonnage of the unrigged craft exceed the totals for steam and sail, and their value is in excess of that reported for the sailing class. Since unrigged vessels are largely dependent upon steam vessels for motive power, and since the same crew frequently operates both the towing vessel and the tow, it is impossible to segregate the income so as to show the amount derived from the operation of the steam vessel as distinct from the barge or scow. For this reason the statistics of income, employees, wages, etc., are included in comparative tables with those for the steam vessels. The unrigged craft are a very important factor in the movement of freight, especially on the inland waters and in and around the principal harbors. The majority of them are built of wood, but the use of iron and steel as material during recent years has added greatly to their value and durability, and accounts in part for the greater increase in value than in number and tonnage.

TABLE 7.—*Unrigged vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	20,263	100.0	7,129,631	100.0	$64,994,249	100.0
Canal boats	2,237	11.0	303,581	4.3	2,952,197	4.5
All other	18,026	89.0	6,826,050	95.7	62,042,052	95.5

Canal boats now form a comparatively small proportion of the fleet of unrigged craft, and their relative importance has been decreasing.

The increase in the variety of work in which unrigged craft can be employed—their use in the shipment of coal and other heavy freight between coast ports, as well as on the lakes, rivers, and canals, and between points within harbors—has caused great activity in their construction. Barges, lighters, and similar craft can be used most economically for this class of work, and, as shown in Table 2, their number and tonnage now form a considerable proportion of the total American shipping. They are used most extensively on the Atlantic coast and the Mississippi river and its tributaries, the greatest increase in the number and tonnage being reported for these waters. Large increases are also shown for those operating on the Pacific coast and the Great Lakes. The decrease in those reported for "all other inland waters" is due primarily to the decrease in the canal boats.

TABLE 8.—*Unrigged vessels, by divisions, with per cent of increase: 1906 and 1889.*

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1906	20,263	7,129,631	$64,994,249
	1889	16,937	4,973,356	22,231,953
Per cent of increase		19.6	43.4	192.3
Atlantic coast and Gulf of Mexico	1906	8,699	2,260,622	41,658,685
	1889	3,425	623,483	7,837,440
Per cent of increase		154.0	262.6	431.5
Pacific coast (including Alaska)	1906	805	154,297	4,649,317
	1889	489	63,356	825,345
Per cent of increase		64.6	143.5	463.3
Great Lakes and St. Lawrence river	1906	783	211,506	6,686,557
	1889	308	139,400	3,472,500
Per cent of increase		154.2	51.7	92.6
Mississippi river and its tributaries	1906	8,187	4,265,740	9,655,372
	1889	6,328	3,171,636	4,784,554
Per cent of increase		29.4	34.5	101.8
All other inland waters	1906	1,789	237,466	2,344,318
	1889	6,387	975,481	5,312,114
Per cent of increase		[1] 72.0	[1] 75.7	[1] 55.9

[1] Decrease.

The larger portion of the freight received at the boroughs of Manhattan and Bronx and at Brooklyn, N. Y., is delivered by water craft, and a considerable proportion comes from surrounding places by means of lighters or barges. Large numbers of these craft were operated in and around New York harbor during 1906, and as they are in constant movement from place to place, probably some were missed in the enumeration. They do virtually an express and drayage business for the harbor, and it was almost as difficult to ascertain the quantity of freight handled on them as it would have been to secure similar data for the wagons and other vehicles moving freight between points on land. Lightering freight is a cheaper means of handling cargoes than the transportation on trucks, as large consignments can be handled on a single lighter, thus keeping the shipment together, and the entire amount can be delivered at one time and discharged directly into the vessel, thus avoiding extra handling. Steamers will not receive cargo after a fixed time, and it is a great advantage to get the entire shipment alongside at once, instead of delivering it on numerous trucks. In some instances, too, large steamers do not come to the wharves, but are loaded and unloaded by lighters, which obtain and deliver the freight at points most convenient to the consignors and consignees. These craft are thus indispensable to the

delivery and shipment of freight in many harbors. Estimates for the freight handled by these harbor craft aggregated 88,026,046 tons for the entire country, exclusive of the Great Lakes, in 1906.

The relative importance of the unrigged craft operating in the different divisions is shown in Table 9.

TABLE 9.—*Unrigged vessels, per cent in each division: 1906 and 1889.*

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1906	100.0	100.0	100.0
	1889	100.0	100.0	100.0
Atlantic coast and Gulf of Mexico	1906	42.9	31.7	64.1
	1889	20.2	12.5	35.8
Pacific coast (including Alaska)	1906	4.0	2.2	7.2
	1889	2.9	1.3	3.7
Great Lakes and St. Lawrence river	1906	3.9	3.0	10.3
	1889	1.8	2.8	15.6
Mississippi river and its tributaries	1906	40.4	59.8	14.9
	1889	37.4	63.8	21.5
All other inland waters	1906	8.8	3.3	3.6
	1889	37.7	19.6	23.9

The number, tonnage, and value of the unrigged craft on the Atlantic and Gulf coasts and the Mississippi river and its tributaries greatly predominate over those of the other divisions. The greatest increase in relative importance is shown for the Atlantic and Gulf coasts. Although the tonnage on the Mississippi has actually increased more rapidly than the number of craft, larger barges now being used for the transportation of coal, the importance of the tonnage as compared with that in the other sections has decreased. There has been also an increase in the number and tonnage of these vessels on the Pacific coast and the Great Lakes, but the greater increase for other divisions has resulted in but a slight advance in their relative importance.

SAILING VESSELS.

This class includes all craft propelled exclusively by the use of sails, irrespective of their employment, and embraces the large vessels engaged in regular traffic, pleasure craft, yachts, pilot boats, etc.

TABLE 10.—*Sail vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	7,131	100.0	1,704,277	100.0	$56,206,145	100.0
Freight and passenger	5,181	72.7	1,672,862	98.2	51,415,756	91.5
Yachts	1,594	22.4	24,155	1.4	4,169,253	7.4
All other	356	5.0	7,260	0.4	621,136	1.1

The regular freight vessels represent 98.2 per cent of the tonnage of the sailing fleet and 91.5 per cent of its value. The 356 sailing craft included in the total of "all other" were engaged in a great variety of work, such as carrying fishing, gunning, and pleasure parties; wrecking; lightering; police duty; and removing garbage. While there were almost 2,000 yachts and miscellaneous sailing craft of 5 tons or over, their aggregate tonnage amounts to less than 2 per cent of the total for sailing vessels and their value less than 9 per cent of the total value.

TABLE 11.—SAIL VESSELS, BY DIVISIONS, WITH PER CENT OF INCREASE: 1906 AND 1889.[1]

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.
Total	1906	7,131	1,704,277	$56,206,145	$32,687,190	25,404	$10,371,047
	1889	7,945	1,675,706	53,192,972	48,278,366	43,523	12,961,592
Per cent of increase		[2]10.3	1.7	5.7	[2]32.3	[2]41.6	[2]20.0
Atlantic coast and Gulf of Mexico	1906	5,920	1,132,905	37,520,903	20,042,015	18,654	6,687,314
	1889	6,277	1,293,192	42,685,982	33,113,416	[2]33,097	[2]8,838,774
Per cent of increase		[2]5.7	[2]12.4	[2]12.1	[2]39.5	[2]43.6	[2]24.3
Pacific coast (including Alaska)	1906	666	305,283	11,533,171	8,299,751	4,481	2,719,571
	1889	681	195,508	6,231,340	6,912,824	4,633	2,313,195
Per cent of increase		[2]2.2	56.1	85.1	20.1	[2]3.3	17.6
Great Lakes and St. Lawrence river	1906	531	265,571	7,135,271	4,341,174	2,258	962,542
	1889	962	185,081	4,238,850	8,240,645	5,758	1,804,003
Per cent of increase		[2]44.8	43.5	68.3	[2]47.3	[2]60.8	[2]46.7
All other inland waters	1906	14	518	16,800	4,250	11	1,620
	1889	25	1,925	36,800	11,481	35	5,620
Per cent of increase		[2]44.0	[2]73.1	[2]54.3	[2]63.0	[2]68.6	[2]71.2

[1] Including schooner barges, etc. [2] Decrease. [3] The employees and wages for yachts were not reported.

The total for sailing vessels shows a decrease in every item except tonnage and value, both of which increased slightly. The only exception to this general decrease is reported for the Pacific coast, where there was a considerable increase in the tonnage, value, and business of the vessels, though the number decreased from 681 in 1889 to 666 in 1906. No sail vessels were reported for the Mississippi river or its tributaries, and those reported for the small lakes and other inland waters are comparatively unimportant.

TABLE 12.—SAIL VESSELS, PER CENT IN EACH DIVISION: 1906 AND 1889.

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.
Total	1906	100.0	100.0	100.0	100.0	100.0	100.0
	1889	100.0	100.0	100.0	100.0	100.0	100.0
Atlantic coast and Gulf of Mexico	1906	83.0	66.5	66.8	61.3	73.4	64.5
	1889	79.0	77.2	80.2	68.6	76.0	68.2
Pacific coast (including Alaska)	1906	9.3	17.9	20.5	25.4	17.6	26.2
	1889	8.6	11.7	11.7	14.3	10.6	17.8
Great Lakes and St. Lawrence river	1906	7.4	15.6	12.7	13.3	8.9	9.3
	1889	12.1	11.0	8.0	17.1	13.2	13.9
All other inland waters	1906	0.2	(1)	(1)	(1)	(1)	(1)
	1889	0.3	0.1	0.1	(1)	0.1	(1)

[1] Less than one-tenth of 1 per cent.

The proportional number of sail vessels on the Atlantic and Gulf coasts has increased since 1889, but the proportion of the tonnage and value, and of the amount of business done by vessels operating on these waters, has decreased. This relative decrease is due in part to the increase on the Pacific coast, as the relative number and importance, with the exception of the tonnage and value, have decreased also on the Great Lakes.

SCHOONER BARGES.

The sailing vessels include craft built primarily to be towed, although equipped with sails which are used only to assist in steering. These craft, known as "schooner barges," are thus described in the report of the Commissioner of Navigation for 1905: "A seagoing schooner barge is a vessel usually towed from port to port, but rigged with masts and furnished with sails, so that if in emergency she breaks adrift from the towing steamer, she may not be helpless at sea. Nearly all of the schooner barges before 1890 were square-rigged vessels or schooners which had outlived their usefulness as such and were dismantled and converted into barges. Shortly before 1890, and to a considerable extent since, such schooner barges have been specially constructed, some of them with steel hulls. The practice of cutting down square-rigged vessels and schooners into barges still continues." The schooner barges might be classed as "unrigged craft," but the Census has followed the practice of the Bureau of Navigation and included them in the group of sail vessels. The statistics for them are shown separately in Table 13, so that they may be combined with other classes if desired.

TABLE 13.—*Schooner barges: 1906.*

	Total.	Atlantic coast and Gulf of Mexico.	Pacific coast.	Great Lakes and St. Lawrence river.
Number of vessels	515	389	9	117
Gross tonnage	492,697	323,618	9,077	160,002
Value of vessels	$13,263,423	$7,497,833	$491,706	$5,273,884
Number of employees	2,300	1,458	74	768
Wages	$1,115,136	$721,911	$53,024	$340,201

The classification of craft as sail or unrigged depends upon the designation given by the managing owners, and it is probable that some equipped with a limited amount of sail, to be used in case of emergency, were reported as "unrigged." It was impracticable to make the classification of the craft depend upon the character or amount of sail, and the line of demarcation, therefore, between the sail and the unrigged is not as clearly defined as may be desirable, but as a rule only those craft that had no sail or other motive power were included in the group of "unrigged."

FERRYBOATS.

Vessels employed in ferry service form an important part of the water transportation system of the country. This class includes self-propelling vessels having a regular route between two neighboring points, carrying passengers, teams, etc. It also includes a certain class of railroad car ferries on which trains are transported between two points on the railroad line. It does not include car floats dependent upon towing vessels, nor a certain class of small ferryboats operated by human power that are frequently found on the small rivers and streams of the country.

For the Great Lakes and all other inland waters at the census of 1889 the gross income, number of employees, and amount of wages paid were not reported separately for ferryboats; therefore it is impossible to make comparisons of such data for those districts. The other items, however, are sufficient to indicate the great increase in the ferry traffic in all the divisions shown in the table with the exception of the Mississippi river, where there was an actual and proportional decrease in the number of employees and wages paid and a relatively small increase in the remaining items.

Ferry passengers form more than 90 per cent of all passengers reported for the census year 1906, and they are the principal source of income for ferryboats, but as shown in Table 14 these vessels derive considerable income from the carriage of freight and from other sources. The income of this character is especially large in proportion to the total for the Pacific coast, the Great Lakes, and the Mississippi river, where a

large number of railroad car ferries are operated and income is derived from other sources than the passenger service. In many cases, particularly on the Mississippi river and its tributaries, the ferrying of wagons, teams, and cattle is largely in excess of the passenger business.

TABLE 14.—FERRYBOATS, BY DIVISIONS, WITH PER CENT OF INCREASE: 1906 AND 1889.

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	GROSS INCOME.			Number of employees.	Wages.	Number of passengers carried.
					Total.	Passengers.	All other sources.			
Total	1906	536	261,073	$29,578,380	$17,291,073	$10,414,106	$6,876,967	4,519	$3,537,180	330,737,639
	1889	456	146,104	10,442,750	(1)	(1)	(1)	(1)	(1)	182,033,991
Per cent of increase		17.5	78.7	183.2						81.7
Atlantic coast and Gulf of Mexico	1906	270	162,834	19,970,466	10,571,534	7,386,913	3,184,621	2,388	2,098,540	272,506,670
	1889	214	98,174	7,907,700	5,392,969			1,710	1,276,847	158,644,012
Per cent of increase		26.2	65.9	152.5	96.0			39.6	64.4	71.8
Pacific coast (including Alaska)	1906	47	40,171	4,315,522	4,208,430	2,037,580	2,170,850	759	708,777	39,532,354
	1889	38	24,630	979,300	994,476			478	395,157	14,291,859
Per cent of increase		23.7	63.1	340.7	323.2			58.8	79.4	176.6
Great Lakes and St. Lawrence river	1906	48	35,581	3,429,532	922,838	456,856	465,982	656	308,156	8,264,482
	1889	40	4,702	498,000	(1)	(1)	(1)	(1)	(1)	623,474
Per cent of increase		20.0	656.7	588.7						1,225.6
Mississippi river and its tributaries	1906	166	22,180	1,776,360	1,553,121	498,747	1,054,374	699	413,553	10,022,612
	1889	163	18,593	1,056,250	1,196,817			893	456,676	8,474,646
Per cent of increase		1.8	19.3	68.2	29.8			[2] 21.7	[2] 9.5	18.3
All other inland waters	1906	5	307	86,500	35,150	34,010	1,140	17	8,154	321,521
	1889	1	5	1,500	(1)	(1)	(1)	(1)	(1)	(1)
Per cent of increase		400.0	6,040.0	5,666.7						

[1] Not reported separately for ferryboats in 1889.

[2] Decrease.

As shown in Table 15, the ferry traffic is largely concentrated in the neighborhood of large centers of population, where different sections of the community are separated from each other by rivers or estuaries which are not spanned by bridges or by a sufficient number of bridges to meet the demand for intercommunication.

TABLE 15.—FERRYBOATS, BY DISTRICTS, WITH PER CENT IN EACH DISTRICT: 1906.

DISTRICT.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.
Total	536	261,073	$29,578,380	$17,291,073	4,519	$3,537,180	330,737,639
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
New York	152	129,690	17,098,677	8,423,119	1,622	1,578,839	208,684,123
Per cent of total	28.4	49.7	57.8	48.7	35.9	44.6	63.1
Philadelphia	25	10,306	918,867	1,009,295	217	195,560	30,616,853
Per cent of total	4.7	3.9	3.1	5.8	4.8	5.5	9.3
New Orleans	11	1,598	214,000	154,415	65	25,467	3,524,470
Per cent of total	2.1	0.6	0.7	0.9	1.4	0.7	1.1
San Francisco	26	35,273	3,415,498	3,924,040	636	598,277	34,905,968
Per cent of total	4.9	13.5	11.5	22.7	14.1	16.9	10.6
Detroit	17	15,649	1,944,882	351,490	308	176,169	6,612,216
Per cent of total	3.2	6.0	6.6	2.0	6.8	5.0	2.0
All other districts	305	68,557	5,986,456	3,428,714	1,671	962,868	46,394,009
Per cent of total	56.9	26.3	20.2	19.8	37.0	27.2	14.0

The statistics for each of the five cities named in the table include all ferries operated in the neighborhood, with the city as the central point, regardless of the ownership of the lines. For example, under New York are included all ferries running between the different subdivisions of the greater city and between New York and the cities in New Jersey. Some of these ferries are owned by the city and others by steam railroad or regular ferry companies.

In addition to the cities named, Boston, Mass., Norfolk, Va., Portland, Oreg., and Seattle, Wash., are important points in ferry traffic, but the statistics for them are included in the total for "all other districts."

Ferry traffic on the Atlantic coast and the Gulf of Mexico exceeds that in all other districts combined, and in like manner the ferry traffic in New York harbor is much greater than in any other locality in the United States, comprising for several items nearly one-half and for passengers carried and value of vessels considerably more than one-half of the total. San Francisco is next in importance to New York, with Philadelphia, Detroit, and New Orleans following in the order named.

Municipal ferries.—Reports were received from 29 ferryboats owned and operated by city governments, and the statistics for them are included in Table 14 and shown separately in Table 16.

TABLE 16.—MUNICIPAL FERRIES: 1906.

DISTRICT.	Number of vessels.	Gross tonnage.	Value of vessels.	GROSS INCOME.		Number of employees.	Wages.	Number of passengers carried.
				Passengers.	All other sources.			
Total	29	20,238	$2,503,447	$621,280	$263,672	290	$458,129	20,945,055
New York harbor	16	14,829	2,253,000	557,437	220,905	188	360,159	12,521,847
Boston harbor	7	4,448	209,347	62,373	41,037	72	70,720	7,242,808
Small points on Connecticut river	2	60	4,100	970	1,230	4	2,150	19,400
Portland, Oreg.	3	857	35,000	.....	.....	25	24,900	1,156,000
Wabasha, Minn.	1	44	2,000	500	500	1	200	5,000

Of the 16 municipal ferries reported for New York harbor, 7 were operated in connection with penal or eleemosynary institutions and 9 were public ferries between different parts of the city on which regular fare was charged. The boats operated by the city of Boston and those on the Connecticut river were also public ferries on which fare was charged; the ferries operated between points in Portland, Oreg., were owned by Multnomah county and operated free of charge; and the ferry at Wabasha, Minn., was operated across the Mississippi river and fare was charged.

YACHTS.

This class includes all craft operated primarily for the pleasure and convenience of the owners. Although they are not operated for profit and take no part in the freight and passenger movement, they are considered as forming a part of the floating equipment of the country that should be included in the census. The great increase in the number of these craft and the difficulty of obtaining satisfactory information concerning them required special arrangements to secure the census reports. The names of the documented yachts and the names and addresses of the owners were obtained from the records of the Bureau of Navigation and those of the others from the officials of the various yacht clubs. These lists were used in mailing schedules and for the guidance of the field agents, but as a considerable proportion of the yachts changed ownership during the year, it was frequently impossible to locate the vessels or to find any person who could give information concerning their tonnage or value. It is probable, therefore, that the statistics in Table 17 do not represent all the yachts of 5 tons or over that were in existence during 1906.

While yachts are, as a rule, of small tonnage, the average for the 3,770 included in the census for 1906 was slightly more than 28 gross tons per vessel; for the steam craft it was 38 tons; and for the sail, 15 tons. The average value per vessel was $7,547; for steam, $11,159; and for sail, $2,616. The steam yachts include the gasoline and electric launches and represent 57.7 per cent of the total number of vessels included in this class. Yachts propelled by machinery are the only kind reported for the Mississippi river and its tributaries, and they also predominate on all the other waters except the Pacific coast, where there was a larger number of sail craft.

TABLE 17.—*Yachts—number, gross tonnage, and value, by divisions: 1906.*

DIVISION AND CLASS.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	3,770	106,430	$28,451,114
Steam	2,176	82,275	24,281,861
Sail	1,594	24,155	4,169,253
Atlantic coast and Gulf of Mexico	2,935	91,507	25,066,062
Steam	1,577	70,461	21,290,339
Sail	1,358	21,046	3,775,723
Pacific coast (including Alaska)	170	2,524	468,910
Steam	66	1,065	294,800
Sail	104	1,459	174,110
Great Lakes and St. Lawrence river	358	7,668	1,877,850
Steam	236	6,210	1,673,000
Sail	122	1,458	204,850
Mississippi river and its tributaries	222	3,255	563,400
Steam	222	3,255	563,400
Sail	.....	.....	.....
Canals and other inland waters of New York state	41	810	276,450
Steam	32	641	262,700
Sail	9	169	13,750
All other inland waters	44	666	198,422
Steam	43	643	197,622
Sail	1	23	800

Of the total number of yachts, 3,439, or 91.2 per cent, were owned by individuals; 246, or 6.5 per cent, by firms; 64, or 1.7 per cent, by corporations; and 21, or six-tenths of 1 per cent, by miscellaneous forms of organizations.

RAILWAY SHIPPING.

The interests of steam railroads in American shipping are represented by car ferry lines, which form, usually, a short connecting link between two points of a railway system; by ferryboats, tugboats, lighters, barges, scows, dredges, and other floating equipment owned and operated directly by the railroad; or by transportation companies having a separate corporate organization, but as a rule subsidiary to the railroad companies which own the whole or a majority of their stock.

The companies that had a separate organization and kept separate accounts of their operations could make

complete reports to the Census Office. These companies, however, usually operate steamships between distant points, or regular ferryboats for general passenger and freight traffic, the statistics for which are included in those for freight and passenger vessels. Reasonably complete information was reported in regard to the harbor craft of railroad companies for all items except the income. This could not be given with any degree of accuracy, because it was derived from the operations of the railroads themselves, and it was impracticable to furnish an estimate of the amounts earned by the water craft. Car ferries form connecting links in railroad lines and transport for short distances whole trains of cars, both freight and passenger; the passengers are undisturbed in their journey and there is no unloading and reloading of freight. In such cases, while the number, tonnage, and value of these vessels form a part of the water transportation facilities of the country, the passengers and freight carried on them form an element in both railroad and water transportation. It was impossible therefore, in many instances, to obtain information of the business done by craft of this kind, but the statistics given in Table 18 will at least indicate the size of the fleet engaged in this service.

TABLE 18.—*Craft operated in connection with steam railroads: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels	1,464	282	1,182
Gross tonnage	575,596	113,386	462,210
Value of vessels	$20,960,301	$12,738,171	$8,222,130
Number of employees	5,092	3,596	1,496
Wages	$3,655,977	$2,665,118	$990,859
Number of passengers carried	37,455,512	37,355,512	100,000

The totals in this table represent the craft engaged in the transportation of freight and passengers, or freight and passenger cars as connecting links in railway systems exclusively, freight vessels operated for the purpose of extending freight business from railroad terminals to adjacent ports without additional charge, vessels used in connection with construction work for railroad companies, and craft owned by the companies and engaged in lightering the freight incident to the operations of the road. The table does not include public ferries operated by railroad companies for foot passengers and teams, or vessels owned by railroad companies but operated as regular freight and passenger lines.

GOVERNMENT VESSELS.

As previously explained, this report does not include statistics for vessels owned by the Federal Government; it does, however, include craft owned by state and city governments, the statistics for which are shown separately in Table 19.

TABLE 19.—*Vessels owned and operated by state and city governments: 1906.*

	Total.	Steam.	Sail.	Unrigged.
Number of vessels	315	143	4	168
Gross tonnage	62,739	36,099	132	26,508
Value of vessels	$8,040,696	$6,803,468	$10,380	$1,226,848
Gross income	[1] $3,177,554	$1,136,594	.....	[1] $2,040,960
Number of employees	1,884	1,150	12	722
Wages	$2,073,028	$1,308,332	$5,470	$759,226
Number of passengers carried	21,344,209	21,344,209	.....	.....

[1] Includes value of work done by craft of the Department of Docks and Ferries, New York city.

The totals in this table include municipal ferryboats, fire boats, police patrol boats, oyster patrol boats, scavenger and garbage boats, quarantine boats, ambulance boats, boats for the protection of fish and game, canal inspection and repair boats, dredges and dredge tenders, steam derricks, pilot boats, pile drivers, ice boats, ice breakers, boats used for scientific investigation, and those used in connection with eleemosynary institutions.

FISHING CRAFT.

Vessels employed in the fishing industry are not included in the census of water transportation. They should nevertheless receive consideration as forming an important element of American shipping, and certain statistics for them collected by the Bureau of Fisheries in connection with other information for fisheries are summarized in Table 20.

TABLE 20.—VESSELS ENGAGED IN THE COMMERCIAL FISHERIES OF THE UNITED STATES AND THE PERSONS EMPLOYED THEREON.[1]

	United States.	Atlantic coast and Gulf of Mexico, 1902 and 1904.	Pacific coast, 1904.	Alaska, 1905.	Mississippi river and its tributaries, 1903.	Great Lakes, 1903.	All other inland waters, 1900 to 1903.
Fishing vessels:							
Number	4,915	4,631	87	3	.....	194	.....
Tonnage (net)	97,367	86,076	7,637	148	.....	3,506	.....
Value	$8,975,626	$7,813,776	$506,400	$21,000	.....	$634,450	.....
Value of outfit	$3,534,027	$3,088,728	$289,897	$8,000	.....	$147,402	.....
Transporting vessels:							
Number	1,995	1,671	139	167	5	12	1
Tonnage (net)	98,765	29,968	2,745	65,552	138	340	22
Value	$5,077,926	$1,795,119	$477,600	$2,735,807	$11,400	$56,000	$2,000
Value of outfit	$354,444	$278,235	$68,055	[2]	[2]	$7,854	$300
Persons employed:							
On fishing vessels	32,079	29,663	1,205	.....	.....	1,211	.....
On transporting vessels	6,212	5,166	401	583	19	38	5

[1] Compiled from the reports of the Bureau of Fisheries.

[2] Not reported.

As the statistics for the various sections of the country cover different years, the totals for the United States do not represent the vessels employed in the fishing industry at one definitely stated time. The totals for the Atlantic coast and Gulf of Mexico are a combination of the figures published separately by the Bureau of Fisheries for the New England states and the South Atlantic and Gulf states for the year 1902, and for the Middle Atlantic states for 1904.

The "persons employed" shown in the table are those employed on fishing vessels and in transporting the catch to market and the supplies to the fishing grounds. In addition, 110,484 persons were employed in shore and boat fisheries and 66,756 on shore in canneries and in various other capacities.

The 6,910 vessels reported as fishing and transporting do not include the small boats and launches employed in the industry; these numbered 82,443 and were valued at $5,656,721.

The "outfit" for which the cost or value is shown for both classes of vessels consists of all supplies necessary in the industry except fishing apparatus, including fuel, provisions, preservatives, dories, etc. The value of the fishing apparatus, which includes seines, nets, lobster pots, dredges, etc., amounted to $8,551,808 for all fisheries in the United States.

While the statistics do not represent all craft engaged in the industry throughout the United States during any given year, they convey an idea of the number, tonnage, and value of the vessels employed in fishing, in transporting the catch, and in other work incident to the industry.

GEOGRAPHIC DIVISIONS.

Different conditions control the development of the shipping on the various navigable waters of the United States. The style of craft operating on the Mississippi and its tributaries could not be employed with advantage on the coasts; the vessels operating on the Great Lakes are designed especially to obtain the best results from the peculiar service in which they are to be employed on these waters. Land transportation, the location of manufacturing enterprises, the development of agricultural pursuits, the deterioration of harbor facilities, the decrease in depth of channels, and various other conditions may have greater effect in some districts than in others on the volume of freight moved. Although it is impracticable to localize the information so as to show exactly the effect of the various factors controlling the increase or decrease on each of the rivers, lakes, or canals, and in different sections of the coast, wherever possible the statistics have been presented for the five divisions shown in Table 21.

TABLE 21.—ALL CLASSES OF VESSELS AND CRAFT, BY DIVISIONS, WITH PER CENT OF INCREASE: 1906 AND 1889.

[Vessels operating as connecting links in railroad systems did not uniformly report the tonnage of freight carried or income for the year. In addition to the craft reported in this table there were 1,762 vessels with a gross tonnage of 179,326 reported as idle in 1906, and 1,490 with a gross tonnage of 233,639 reported as idle, untraceable, or lost prior to or during 1889.]

DIVISION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.
Total	1906	37,321	12,893,429	$507,973,121	$294,854,532	140,929	$71,636,521	366,825,663
	1889	30,485	8,359,135	206,992,352	161,994,066	113,870	41,482,812	198,992,438
Per cent of increase		22.4	54.2	145.4	82.0	23.8	72.7	84.3
Atlantic coast and Gulf of Mexico [1]	1906	20,032	4,851,421	273,105,915	159,759,924	77,124	38,352,259	292,555,416
	1889	12,238	2,658,445	116,042,062	90,147,632	[2] 63,625	[2] 22,123,099	170,225,458
Per cent of increase		63.7	82.5	135.4	77.2	21.2	73.4	71.9
Pacific coast (including Alaska)	1906	2,537	977,087	76,622,633	48,520,139	20,142	12,950,399	44,189,971
	1889	1,635	419,157	21,824,040	19,872,738	11,315	5,880,421	15,672,093
Per cent of increase		55.2	133.3	251.1	144.2	78.0	120.2	182.0
Great Lakes and St. Lawrence river	1906	2,990	2,392,863	130,805,640	65,274,702	24,916	13,280,716	14,080,146
	1889	2,737	920,294	48,580,174	35,463,852	22,726	8,098,191	2,235,993
Per cent of increase		9.2	160.0	169.3	84.1	9.6	64.0	529.7
Mississippi river and its tributaries	1906	9,622	4,411,967	22,852,142	17,342,038	15,016	5,692,117	14,122,241
	1889	7,300	3,364,810	14,407,162	16,331,872	15,951	5,337,185	10,858,804
Per cent of increase		31.8	31.1	58.5	6.2	[3] 5.9	6.7	30.1
All other inland waters	1906	2,140	259,491	4,586,791	3,957,729	3,731	1,361,030	1,877,889
	1889	6,575	996,629	6,138,914	[4] 177,972	[4] 253	[4] 43,916	
Per cent of increase		[3] 67.5	[3] 74.0	[3] 25.3				

[1] Total for 1889 includes 52 craft with a gross tonnage of 2,553, valued at $75,360, for which no report was made for income, employees, wages, passengers, and freight carried.
[2] Does not include employees or wages for yachts.
[3] Decrease.
[4] Income, employees, and wages were not reported for canal boats at the census of 1889, and therefore the per cent of increase is not given.

Vessels were classified according to the waters on which they operated principally in 1906, and not according to the port at which they were documented, which was the rule in 1889. The coasts and tributary rivers up to what is generally known as the "head of navigation" are included in the "Atlantic coast and Gulf of Mexico" and the "Pacific coast." The Mississippi river is an exception, the entire river system being included under "Mississippi river and its tributaries." The division "all other inland waters" includes vessels operating on waters not otherwise classified.

All classes of craft are covered by this table and the statistics represent the entire floating equipment included in the census for each of the five divisions. By

far the largest proportion of American shipping operates on the Atlantic coast and the Gulf of Mexico, and the greatest increases in number, tonnage, value, and the other items shown in the table are reported for these waters. The next greatest number and tonnage are shown for the Mississippi river and its tributaries. The total for these rivers includes the figures for a large number of coal barges and similar craft, which increase the total number and tonnage out of proportion to the value and amount of business done; the smaller number and tonnage reported for the Great Lakes and St. Lawrence river represent a much greater value, and their gross earnings for the census of 1906 was almost four times as great as the income of the vessels on the Mississippi. The largest percentage of increase in all items covered by the table, except number of vessels, gross tonnage, and passengers carried, is shown for the shipping on the Pacific coast.

While the comparison of the data for the two census years indicates an increase in the total for all varieties of shipping on the Mississippi and its tributaries, the increase is not as great as in the other divisions, and there has been apparently a decrease in the number of employees. A consideration of the statistics given in Tables 5 to 17 for the different classes of vessels in each division permits a better understanding of the general totals for the divisions.

DIAGRAM 3.—*Gross tonnage of all vessels: 1906.*

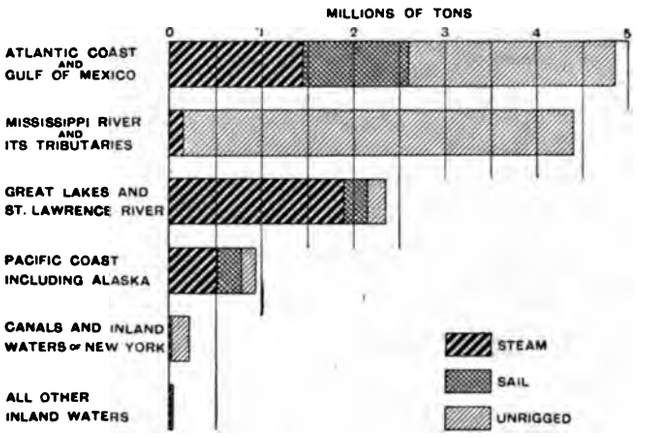
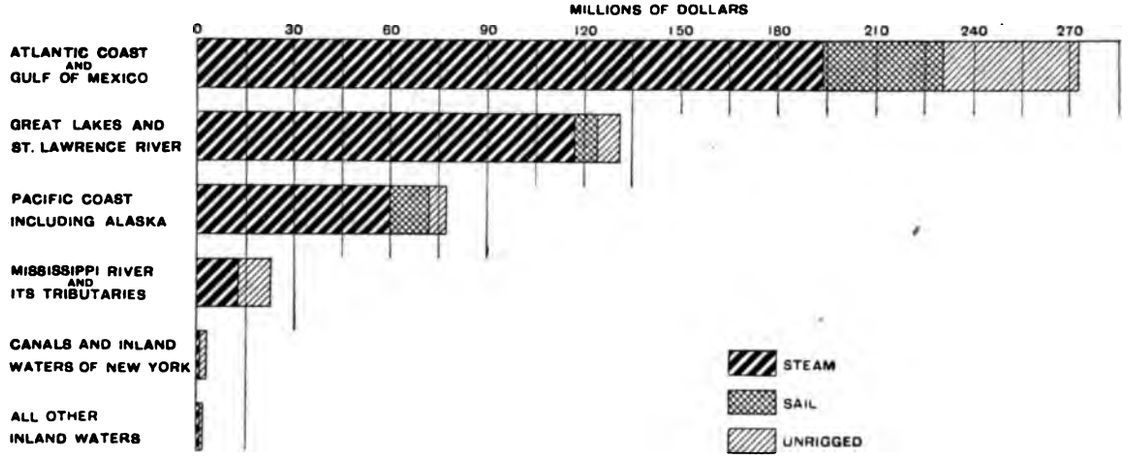


DIAGRAM 4.—VALUE OF ALL VESSELS: 1906.



OWNERSHIP OF VESSELS.

To show the relative importance of the vessels operating under the different forms of ownership statistics are presented for the following classes: (1) Individual, (2) firm, (3) incorporated company, and (4) "miscellaneous," which embraces craft owned by pilot and cooperative associations, those operated by local governments, etc.

At the census of 1889 the statistics of ownership were limited to the number, tonnage, and value of the vessels operating on the Atlantic coast and Gulf of Mexico and on the Pacific coast. The totals were shown for individual ownership, joint-stock companies, and corporations. But as it can not be determined definitely whether vessels owned by firms were included with those owned by joint-stock companies or with those owned by individuals, in comparing the statistics for these two divisions data are given only for corporate companies and for all other forms of ownership combined.

TABLE 22.—OWNERSHIP FOR STEAM AND SAIL VESSELS ON THE ATLANTIC COAST AND GULF OF MEXICO AND THE PACIFIC COAST: 1906 AND 1889.

DIVISION, CLASS, AND OWNERSHIP.	VESSELS.				TONNAGE.				VALUE OF VESSELS.			
	Number.		Per cent of total.		Gross tons.		Per cent of total.		Amount.		Per cent of total.	
	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889
Atlantic coast and Gulf of Mexico: Steam and sail	11,333	8,813	100.0	100.0	2,590,799	2,034,962	100.0	100.0	$231,447,230	$108,204,622	100.0	100.0
Incorporated company	2,630	1,019	23.2	11.6	1,644,044	571,181	63.5	28.1	167,929,716	43,376,790	72.6	40.1
All other forms of ownership	8,703	7,794	76.8	88.4	946,755	1,463,781	36.5	71.9	63,517,514	64,827,832	27.4	59.9
Steam	5,413	2,536	100.0	100.0	1,457,894	741,770	100.0	100.0	193,926,327	65,518,640	100.0	100.0
Incorporated company	2,072	917	38.3	36.2	1,244,283	545,683	85.3	73.6	155,819,420	42,892,910	80.3	65.5
All other forms of ownership	3,341	1,619	61.7	63.8	213,611	196,087	14.7	26.4	38,106,907	22,625,730	19.7	34.5
Sail	5,920	6,277	100.0	100.0	1,132,905	1,293,192	100.0	100.0	37,520,903	42,685,982	100.0	100.0
Incorporated company	558	102	9.4	1.6	399,761	25,498	35.3	2.0	12,110,296	483,880	32.3	1.1
All other forms of ownership	5,362	6,175	90.6	98.4	733,144	1,267,694	64.7	98.0	25,410,607	42,202,102	67.7	98.9
Pacific coast (including Alaska): Steam and sail	1,732	1,146	100.0	100.0	823,390	355,801	100.0	100.0	71,973,316	20,998,695	100.0	100.0
Incorporated company	796	281	46.0	24.5	637,571	164,398	77.4	46.2	61,426,691	12,313,110	85.3	58.6
All other forms of ownership	936	865	54.0	75.5	185,819	191,403	22.6	53.8	10,546,625	8,685,585	14.7	41.4
Steam	1,066	465	100.0	100.0	518,107	160,293	100.0	100.0	60,440,145	14,767,355	100.0	100.0
Incorporated company	609	221	57.1	47.5	477,815	127,498	92.2	79.5	55,560,485	11,575,605	91.9	78.4
All other forms of ownership	457	244	42.9	52.5	40,292	32,795	7.8	20.5	4,879,660	3,191,750	8.1	21.6
Sail	666	681	100.0	100.0	305,283	195,508	100.0	100.0	11,533,171	6,231,340	100.0	100.0
Incorporated company	187	60	28.1	8.8	159,756	36,900	52.3	18.9	5,866,206	737,505	50.9	11.8
All other forms of ownership	479	621	71.9	91.2	145,527	158,608	47.7	81.1	5,666,965	5,493,835	49.1	88.2

The table indicates that at the census of 1906 vessels operated by corporations constituted a much larger proportion of the total number than at the census of 1889, and corresponding increases in relative importance are shown for their tonnage and value. In 1889 corporations controlled 28.1 per cent of the tonnage operating on the Atlantic coast and 46.2 per cent of that operating on the Pacific coast; in 1906 these proportions had increased to 63.5 and 77.4 per cent, respectively. Of the number, tonnage, and value of steam vessels, the proportion under corporation control was larger at both censuses than the corresponding proportions for sailing craft, although the table shows that there has been a large increase in the percentage of sail vessels operating under this form of ownership. Small craft are, as a rule, owned by individuals or firms, and large numbers of them operate on the Atlantic coast, where vessels owned by corporations represent a considerably smaller proportion of the total than on the Pacific coast.

TABLE 23.—*Number, gross tonnage, and value of vessels, by character of ownership, with per cent in each class: 1906.*

OWNERSHIP.	VESSELS.		TONNAGE.		VALUE OF VESSELS.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.
Total	37,321	100.0	12,893,429	100.0	$507,973,121	100.0
Individual	12,944	34.7	1,462,818	11.3	65,833,525	13.0
Firm	4,169	11.2	929,311	7.2	28,807,734	5.7
Incorporated company	19,729	52.9	10,375,681	80.5	402,419,557	79.2
Miscellaneous	479	1.3	125,619	1.0	10,912,305	2.1

Individual ownership.—The average tonnage of the 12,944 vessels owned by individuals was 113 as compared with an average of 223 tons for those owned by firms, and 526 tons for the vessels operated by corporations. Many of the yachts are of greater value per ton than other classes of craft, with the result that this group represents a larger percentage of the total value than of the total tonnage. Comparatively few individual owners, however, operate very large craft, so that while they still control more than a third of the vessels, the tonnage and value of these craft are but slightly more than one-tenth of the totals for all craft.

Firm.—This class includes all vessels operated by firms and partnerships, whether general or limited, and all those operated by shareholders, though there may be no formal articles of partnership. While the average tonnage of the 4,169 vessels included in the group is considerably larger than the average for "individuals," the total number, tonnage, and value is much less; and with the exception of the miscellaneous group, this form of ownership represents the smallest proportion of the floating equipment.

Incorporated company.—The principal industries of the country owe their great development very largely to the influence of corporations. The advantages of this form of organization for the conduct of large enterprises were early recognized by the shipping interests and are now well established. The large capital required for the construction and maintenance

of the lines of freight and passenger steamers operating on the coasts and inland waters was most readily secured through the corporate form of ownership, which enables numerous individuals to contribute, and renders it possible to secure the advantage of the economies made practicable by the concentration of management and the continuity of existence that are incident to the corporation. Of the 37,321 vessels included in the census of 1906, corporations owned more than one-half, representing more than three-fourths both of the tonnage and of the value of the merchant marine; of all steam vessels, they controlled 42.6 per cent, representing 87.6 per cent of the gross steam tonnage; and of the regular freight and passenger vessels, they controlled 56.8 per cent of the number with 91 per cent of the tonnage. Steam yachts in fact are the only class of steam craft in which corporations do not own the larger portion of the gross tonnage.

Sailing vessels are more evenly distributed among the different forms of ownership, but corporations own 43.6 per cent of the tonnage of the regular freight sailing vessels, while of the unrigged tonnage, they control 85.4 per cent.

TABLE 24.—NUMBER AND GROSS TONNAGE OF VESSELS, BY CHARACTER OF OWNERSHIP AND BY OCCUPATION: 1906.

CLASS AND OCCUPATION.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	37,321	12,893,429	12,944	1,462,818	4,169	929,311	19,729	10,375,681	479	125,619
Steam	9,927	4,059,521	4,359	316,219	1,141	145,326	4,224	3,555,040	203	42,936
Freight and passenger	3,615	3,411,588	1,101	189,707	437	113,611	2,055	3,104,291	22	3,979
Tugs and other towing vessels	3,079	261,375	902	37,079	488	25,286	1,644	192,313	45	6,697
Ferryboats	536	261,073	115	5,423	39	1,752	352	233,630	30	20,268
Yachts	2,176	82,275	1,978	78,188	130	2,415	55	1,500	13	172
All other	521	43,210	263	5,822	47	2,262	118	23,306	93	11,820
Sail	7,131	1,704,277	4,772	483,859	1,403	435,756	857	729,784	99	54,878
Freight and passenger	5,181	1,672,862	3,028	457,877	1,252	433,412	840	728,714	61	52,859
Yachts	1,594	24,155	1,461	22,540	116	1,310	9	161	8	144
All other	356	7,260	283	3,442	35	1,034	8	909	30	1,875
Unrigged	20,263	7,129,631	3,813	662,740	1,625	348,229	14,648	6,090,857	177	27,805

Miscellaneous.—This class includes all craft that could not be assigned to any of the other forms of ownership. They represent less than 1 per cent of the total tonnage, and are not as a rule connected with the movement of freight and passengers. The majority of them are owned by local governments and cooperative associations.

CONSTRUCTION.

Iron was first used in marine construction about 1800, when a small canal boat was built in England with wooden frames and planked with boiler iron, and this marked the advent of the metal shipbuilding of the present day. In 1821, at Horsley, England, was built the first iron steamboat, a small vessel intended for river service. For nearly a decade iron construction was confined to vessels intended for river and inland service, but about the year 1838 iron sailing vessels of from 200 to 300 tons were being built for ocean voyages. So far as England is concerned this period marks the increase in iron construction and the decrease in that from wood.[1]

The first record of an iron vessel in the United States is in 1825, when a small iron steamboat was launched on the Susquehanna river, in Pennsylvania.[1] The exact dates of the launching of other iron vessels are uncertain, but the abundance and cheapness of wood have retarded metal shipbuilding in this country.

[1] Tenth Census. Report on Shipbuilding Industry.

TABLE 25.—*Shipbuilding—value of new construction: 1880 to 1905.*[1]

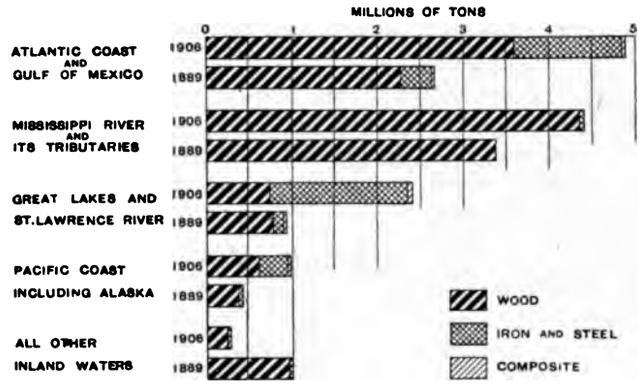
CENSUS.	Total.	Iron and steel.	Wood.	Per cent of increase, iron and steel.	Per cent of increase, wood.
1905	$53,119,935	$43,395,704	$9,724,231	70.5	[2] 5.6
Per cent		81.7	18.3		
1900	35,750,473	25,454,943	10,295,530	120.4	[2] 20.4
Per cent		71.2	28.8		
1890	24,483,995	11,550,846	12,933,149	126.7	[2] 8.5
Per cent		47.2	52.8		
1880	19,225,714	5,096,293	14,129,421		
Per cent		26.5	73.5		

[1] Census of Manufactures, 1905, Shipbuilding. [2] Decrease.

The statistics in this table were obtained from the Census reports on manufactures, and as the report of 1880 was the first at which the construction of iron and steel and of wooden vessels were reported separately, comparative figures begin with that date. The percentages shown in this table bring out very clearly the advance in iron and steel construction and the decrease in wooden shipbuilding. During the period covered there was a constant increase in construction of the former class from a value of $5,096,293, representing 26.5 per cent of the total value of new construction reported in 1880, to $43,395,704, or 81.7 per cent, in 1905. On the other hand, wooden construction, which was valued at $14,129,421, or 73.5

per cent of the total in 1880, fell to $9,724,231, or 18.3 per cent, in 1905.

DIAGRAM 5.—*Gross tonnage of all vessels, by character of construction: 1906 and 1889.*



The decrease in wood as a material of construction is due largely to the superior advantages possessed by iron and steel (or at the present time more particularly by steel, since the use of iron for this purpose has practically ceased). Among these may be mentioned lightness and buoyancy of hull and a somewhat greater cargo capacity for vessels of a corresponding tonnage. The life of the metal vessel is very much greater, the rate of insurance considerably less, and as a rule a smaller outlay for repairs is required.

The census of water transportation contains no information in regard to the initial cost of constructing vessels. While the statistics of valuation may be used as a factor to determine the relative importance of the metal and the wooden vessels, the number and gross tonnage are considered more reliable data in determining the increase or decrease.

TABLE 26.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS IN EACH DIVISION, BY CHARACTER OF CONSTRUCTION, WITH PER CENT OF INCREASE: 1906 AND 1889.

DIVISION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1906	37,321	12,893,429	$507,973,121	1,979	3,276,723	$306,229,289	35,247	9,581,348	$199,135,582	95	35,358	$2,608,250
	1889	30,485	8,359,135	206,992,352	548	525,218	50,918,319	29,834	7,793,259	153,552,913	103	40,658	2,521,120
Per cent of increase		22.4	54.2	145.4	261.1	523.9	501.4	18.1	22.9	29.7	[1] 7.8	[1] 13.0	3.5
Atlantic coast and Gulf of Mexico.[2]	1906	20,032	4,851,421	273,105,915	1,148	1,247,838	155,776,134	18,827	3,591,278	115,877,581	57	12,305	1,452,200
	1889	12,238	2,658,445	116,042,062	434	364,283	33,622,030	11,714	2,269,558	81,236,912	90	24,604	1,183,120
Per cent of increase		63.7	82.5	135.4	164.5	242.5	363.3	60.7	58.2	42.6	[1] 36.7	[1] 50.0	22.7
Pacific coast (including Alaska).[3]	1906	2,537	977,687	76,622,633	130	354,134	41,375,742	2,404	622,606	35,168,891	3	947	78,000
	1889	1,635	419,157	21,824,040	23	48,121	6,613,065	1,610	369,738	15,100,975	2	1,298	110,000
Per cent of increase		55.2	133.3	251.1	465.2	635.9	525.7	49.3	68.4	132.9	50.0	[1] 27.0	[1] 29.1
Great Lakes and St. Lawrence river.	1906	2,990	2,392,863	130,805,640	572	1,634,153	105,729,416	2,391	737,386	24,075,474	27	21,324	1,000,750
	1889	2,737	920,294	48,580,174	85	111,410	10,574,224	2,641	794,128	36,777,950	11	14,756	1,228,000
Per cent of increase		9.2	160.0	169.3	572.9	1,366.8	899.9	[1] 9.5	[1] 7.1	[1] 34.5	145.5	44.5	[1] 18.5
Mississippi river and its tributaries.[3]	1906	9,622	4,411,967	22,852,142	107	33,893	2,580,682	9,513	4,377,480	20,213,460	2	594	58,000
	1889	7,300	3,364,610	14,407,162	.....	.....	.....	7,300	3,364,610	14,407,162	.....	.....	.....
Per cent of increase		31.8	31.1	58.6	.....	.....	.....	30.3	30.1	40.3	.....	.....	.....
All other inland waters.[4]	1906	2,140	259,491	4,586,791	22	6,705	767,315	2,112	252,598	3,800,176	6	188	19,300
	1889	6,575	996,629	6,138,914	6	1,404	109,000	6,569	995,225	6,029,914	.....	.....	.....
Per cent of increase		[1] 67.5	[1] 74.0	[1] 25.3	266.7	377.6	604.0	[1] 67.8	[1] 74.6	[1] 37.0	.....	.....	.....

[1] Decrease.
[2] The character of construction of unrigged craft was not reported in 1889, but for purposes of comparison in this table all were assumed to be of wood.
[3] The character of construction was not reported in 1889, but for purposes of comparison in this table all vessels were assumed to be of wood.
[4] The character of construction was not reported for 14 vessels operating on the Red River (of the North) and 6,514 canal boats in 1889, but for purposes of comparison in this table all of these were assumed to be of wood.

There were very few unrigged craft of metal construction in 1889, and as the statistics for them were not shown separately at that census they are all included as "wood" in this table; all the vessels operating on the Mississippi river and its tributaries in 1889 are also considered as being of wood construction. The inclusion of these two groups as wooden craft has tended to increase slightly the totals for such vessels in 1889, but it is believed that the number, tonnage, and value of the metal vessels included were so small that they would have no appreciable effect on the percentages.

Although in 1906, as in 1889, much the largest proportion of the tonnage of the merchant marine was still of wood construction, in 1906, the gross tonnage reported for vessels constructed of iron or steel had increased 2,751,505 gross tons, or 523.9 per cent. The increase in wood construction was very much less, being actually 1,788,089 gross tons, or 22.9 per cent. Vessels of composite construction decreased by 5,300 tons. The most notable increase in iron and steel tonnage occurred on the Great Lakes, where there was a gain of 1,522,743 gross tons, accompanied by an actual decrease of 56,742 gross tons for wooden vessels. The largest increase in the gross tonnage of wooden vessels—1,321,720 tons—is shown for the Atlantic coast. Of the total gross tonnage reported for 1906, 3,276,723 tons, or 25.4 per cent, was for vessels of iron or steel construction; 9,581,348 tons, or 74.3 per cent, for wooden vessels; and 35,358 tons, or three-tenths of 1 per cent, for vessels of composite construction.

The number, tonnage, and value of the different classes of vessels, grouped according to the character of construction, are given in Table 27.

TABLE 27.—VESSELS OF EACH OCCUPATION IN EACH DIVISION, GROUPED BY CHARACTER OF CONSTRUCTION: 1906.

OCCUPATION AND DIVISION.	TOTAL.			IRON.			STEEL.			WOOD.			COMPOSITE.		
	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
STEAM.															
Freight and passenger	3,615	3,411,588	$286,218,089	218	314,107	$29,361,787	690	2,309,444	$209,113,544	2,690	768,857	$46,634,758	17	19,180	$1,108,000
Atlantic coast and Gulf of Mexico	1,523	1,045,811	121,136,485	156	194,638	17,735,465	239	654,431	86,647,264	1,123	193,987	16,563,756	5	2,755	190,000
Pacific coast (including Alaska)	604	451,270	52,164,977	37	92,378	9,756,072	49	220,839	28,796,941	517	137,634	13,561,964	1	419	50,000
Great Lakes and St. Lawrence river	932	1,842,251	107,897,440	24	27,041	1,865,750	388	1,426,876	92,862,714	510	372,453	12,308,976	10	15,881	860,000
Mississippi river and its tributaries	390	55,779	3,737,450	1	50	4,500	9	2,912	317,000	379	52,692	3,407,950	1	125	8,000
Canals and other inland waters of New York state	79	11,521	898,500				5	4,386	489,625	74	7,135	408,875			
All other inland waters	87	4,956	383,237							87	4,956	383,237			
Tugs and other towing vessels	3,079	261,375	39,062,249	169	20,395	3,683,955	251	63,507	10,890,462	2,649	176,513	24,383,332	10	960	104,500
Atlantic coast and Gulf of Mexico	1,690	148,992	25,894,551	140	17,685	3,185,940	183	52,449	8,869,821	1,363	78,582	13,808,790	4	276	30,000
Pacific coast (including Alaska)	313	24,151	3,353,927	4	804	205,727	10	1,678	417,467	299	21,669	2,730,733			
Great Lakes and St. Lawrence river	382	22,663	2,630,097	6	394	34,300	33	3,872	568,729	342	18,242	2,017,068	1	155	10,000
Mississippi river and its tributaries	619	62,836	6,822,210	18	1,398	245,988	22	5,088	954,445	578	55,881	5,571,777	1	469	50,000
Canals and other inland waters of New York state	38	1,868	222,812	1	114	12,000	3	420	80,000	32	1,295	120,812	2	39	10,000
All other inland waters	37	865	138,652							35	844	134,152	2	21	4,500
Ferryboats	536	261,073	29,578,380	64	43,513	5,978,517	92	107,893	13,861,081	379	109,253	9,715,782	1	414	23,000
Atlantic coast and Gulf of Mexico	270	162,834	19,970,466	61	42,996	5,893,517	66	71,502	10,078,250	143	48,336	3,998,699			
Pacific coast (including Alaska)	47	40,171	4,315,522				2	2,964	450,000	44	36,793	3,842,522	1	414	23,000
Great Lakes and St. Lawrence river	48	35,581	3,429,532				14	27,308	2,798,087	34	8,213	631,445			
Mississippi river and its tributaries	166	22,180	1,776,360	3	517	85,000	10	6,059	534,744	153	15,604	1,156,616			
Canals and other inland waters of New York state	2	97	6,500							2	97	6,500			
All other inland waters	3	210	80,000							3	210	80,000			
Yachts	2,176	82,275	24,281,861	13	2,121	512,000	121	36,173	12,012,020	2,016	41,643	11,036,641	26	2,338	721,200
Atlantic coast and Gulf of Mexico	1,577	70,461	21,290,339	9	1,754	383,000	98	34,615	11,424,070	1,449	31,944	8,797,269	21	2,148	686,000
Pacific coast (including Alaska)	66	1,065	294,800				1	102	17,000	65	963	277,800			
Great Lakes and St. Lawrence river	236	6,210	1,673,000	2	317	95,000	10	955	421,750	220	4,773	1,125,050	4	165	31,200
Mississippi river and its tributaries	222	3,255	563,400	2	50	34,000	9	318	57,500	211	2,887	471,900			
Canals and other inland waters of New York state	32	641	262,700				1	146	75,000	31	495	187,700			
All other inland waters	43	643	197,622				2	37	16,700	40	581	176,922	1	25	4,000
All other	521	43,210	7,632,148	21	5,193	938,800	35	14,171	3,337,272	463	23,193	3,256,076	2	653	100,000
Atlantic coast and Gulf of Mexico	353	29,796	5,634,486	19	5,066	888,800	22	11,310	2,534,150	310	12,767	2,111,536	2	653	100,000
Pacific coast (including Alaska)	36	1,450	310,919	1	27	15,000	1	203	44,329	34	1,220	251,590			
Great Lakes and St. Lawrence river	78	9,081	1,353,743				12	2,658	758,793	66	6,423	594,950			
Mississippi river and its tributaries	38	2,177	297,350	1	100	35,000				37	2,077	262,350			
Canals and other inland waters of New York state															
All other inland waters	16	706	35,650							16	706	35,650			
SAIL.															
Freight and passenger	5,181	1,672,862	51,415,756	34	40,345	1,751,471	76	185,268	8,080,980	5,069	1,442,556	41,347,305	2	4,693	236,000
Atlantic coast and Gulf of Mexico	4,227	1,105,901	33,213,849	22	23,639	785,471	35	58,831	2,803,315	4,168	1,018,738	29,389,063	2	4,693	236,000
Pacific coast (including Alaska)	547	302,798	11,275,586	12	16,706	966,000	8	15,142	676,206	527	270,950	9,633,380			
Great Lakes and St. Lawrence river	403	263,837	6,924,071				33	111,295	4,601,459	370	152,542	2,322,612			
Mississippi river and its tributaries															
Canals and other inland waters of New York state	4	326	2,250							4	326	2,250			
All other inland waters															
Yachts	1,594	24,155	4,169,253	3	299	51,000	18	2,137	715,300	1,549	20,954	3,202,453	24	855	200,500
Atlantic coast and Gulf of Mexico	1,358	21,046	3,775,743	2	134	21,000	17	2,122	714,000	1,317	17,958	2,842,543	22	832	198,200
Pacific coast (including Alaska)	104	1,459	174,110							104	1,459	174,110			
Great Lakes and St. Lawrence river	122	1,458	204,850	1	75	30,000	1	15	1,300	118	1,345	171,250	2	23	2,300
Mississippi river and its tributaries															
Canals and other inland waters of New York state	9	169	13,750							9	169	13,750			
All other inland waters	1	23	800							1	23	800			
All other	356	7,260	621,136							355	7,146	616,136	1	114	5,000
Atlantic coast and Gulf of Mexico	335	5,958	531,311							335	5,958	531,311			
Pacific coast (including Alaska)	15	1,026	83,475							14	912	78,475	1	114	5,000
Great Lakes and St. Lawrence river	6	276	6,350							6	276	6,350			
Mississippi river and its tributaries															
Canals and other inland waters of New York state															
All other inland waters															
UNRIGGED.															
Canal boats	2,237	303,581	2,952,197				9	602	18,500	2,227	302,876	2,932,897	1	103	800
Atlantic coast and Gulf of Mexico	663	103,877	1,112,475							663	103,877	1,112,475			
Pacific coast (including Alaska)															
Great Lakes and St. Lawrence river	6	1,134	13,800							6	1,134	13,800			
Mississippi river and its tributaries	2	323	4,100							2	323	4,100			
Canals and other inland waters of New York state	1,364	173,388	1,583,835							1,363	173,285	1,583,035	1	103	800
All other inland waters	202	24,859	237,987				9	602	18,500	193	24,257	219,487			
All other	18,026	6,826,050	62,042,052	9	5,678	78,850	156	125,967	5,843,750	17,850	6,688,357	56,010,202	11	6,048	109,250
Atlantic coast and Gulf of Mexico	8,036	2,156,745	40,546,210	5	2,520	27,350	74	74,146	3,784,721	7,956	2,079,131	36,722,139	1	948	12,000
Pacific coast (including Alaska)	805	154,297	4,649,317	3	2,525	19,000	2	766	12,000	800	151,006	4,618,317			
Great Lakes and St. Lawrence river	777	210,372	6,672,757				48	33,287	1,691,534	719	171,985	4,883,973	10	5,100	97,250
Mississippi river and its tributaries	8,185	4,265,417	9,651,272	1	633	32,500	31	16,768	280,005	8,153	4,248,016	9,338,767			
Canals and other inland waters of New York state	120	21,142	303,874				1	1,000	75,490	119	20,142	228,384			
All other inland waters	103	18,077	218,622							103	18,077	218,622			

The separation of the statistics for iron and steel vessels results in showing the great importance of steel tonnage as compared with that of iron, wood, or composite materials. Of the gross tonnage of 3,411,588 reported for the steam passenger and freight vessels, 2,309,444 tons, or 67.7 per cent, was for vessels of steel construction. While the importance of steel tonnage is not so pronounced for some of the other classes of vessels, it represents 24.3 per cent of the total gross tonnage for tugs and 41.3 per cent of that for ferryboats. A large proportion also of the tonnage of yachts on the Atlantic coast is of steel construction.

Vessels of wooden construction still predominate among the sailing craft and represent 86.2 per cent of the gross tonnage for the freight and passenger vessels. The 33 freight and passenger steel sailing vessels of 111,295 gross tons on the Great Lakes are almost all schooner barges, which, as explained on page 14, are included as sail rather than as unrigged craft.

The great preponderance of wooden tonnage among the unrigged craft is due partly to the class of work in which these craft are employed, and also to the fact that large numbers of them are controlled by small owners who can not command the capital required for the operation of vessels constructed of more expensive material.

The increase or decrease in the relative importance of metal and wooden tonnage in the different divisions is shown in Table 28.

TABLE 28.—*Per cent of gross tonnage of iron and steel, wood, and composite vessels, by divisions: 1906 and 1889.*

DIVISION.	Census.	Total.	Iron and steel.	Wood.	Composite.
Total	1906	100.0	25.4	74.3	0.3
	1889	100.0	6.3	93.2	0.5
Atlantic coast and Gulf of Mexico[1]	1906	100.0	25.7	74.0	0.3
	1889	100.0	13.7	85.4	0.9
Pacific coast (including Alaska)[1]	1906	100.0	36.2	63.7	0.1
	1889	100.0	11.5	88.2	0.3
Great Lakes and St. Lawrence river.	1906	100.0	68.3	30.8	0.9
	1889	100.0	12.1	86.3	1.6
Mississippi river and its tributaries.[2]	1906	100.0	0.8	99.2	[3]
	1889	100.0	.....	100.0	.....
All other inland waters[4]	1906	100.0	2.6	97.3	0.1
	1889	100.0	0.1	99.9	.....

[1] The character of construction of unrigged craft was not reported in 1889, but for purposes of comparison in this table they were all assumed to be of wood.
[2] The character of construction was not reported in 1889, but for purposes of comparison in this table all vessels were assumed to be of wood.
[3] Less than one-tenth of 1 per cent.
[4] The character of construction was not reported for 14 vessels operating on the Red River (of the North) and 6,514 canal boats in 1889, but for purposes of comparison in this table all of these were assumed to be of wood.

NUMBER AND TONNAGE OF VESSELS.

The individual craft was the unit of the Census enumeration, and the tonnage, which was reported for each craft, is the safest unit of measurement to determine their size and relative importance. "Five tons net register" represented the minimum size of craft included in the census. This term as used for Census purposes means a vessel the internal cubical contents of which are 500 cubic feet, excluding machinery and space occupied by the crew, or in the case of a vessel not documented it was construed to mean a vessel carrying 10 tons of cargo of 2,000 pounds each. Both the gross and net tonnage were reported, and for all documented vessels it was possible to make a correct report of the two kinds of tonnage. For undocumented vessels, for which the actual tonnage had not been ascertained, an estimate was accepted, and it was impossible, in many instances, to obtain a satisfactory report of the net as distinguished from the gross tonnage.

In steam vessels the space required for boilers, engines, and various superstructures reduces the percentage of net tonnage, though there is considerable variation in the proportion for the different classes of craft. There being less space required for this purpose in sailing vessels, the percentage of net tonnage is larger, and it is still larger for the unrigged craft.

TABLE 29.—*Gross and net tonnage, with per cent net is of gross tonnage, by class of vessels: 1906.*

CLASS AND OCCUPATION.	Gross tonnage.	NET TONNAGE.	
		Number of tons.	Per cent of gross tonnage.
Total	12,893,429	11,484,833	89.1
Steam	4,059,521	2,918,476	71.9
Freight and passenger	3,411,588	2,474,183	72.5
Tugs and other towing vessels	261,375	174,373	66.7
Ferryboats	261,073	187,238	71.7
Yachts	82,275	54,123	65.8
All other	43,210	28,559	66.1
Sail	1,704,277	1,539,513	90.3
Freight and passenger	1,672,862	1,510,658	90.3
Yachts	24,155	22,176	91.8
All other	7,260	6,679	92.0
Unrigged	7,129,631	7,026,844	98.6
Canal boats	303,581	292,386	96.3
All other	6,826,050	6,734,458	98.7

While this table indicates that the proportion which the net tonnage, as reported to the Census, constitutes of the gross tonnage is fairly consistent for the different classes of vessels, it is believed that the figures for gross tonnage are the more reliable; they are therefore used in all other tables of this report.

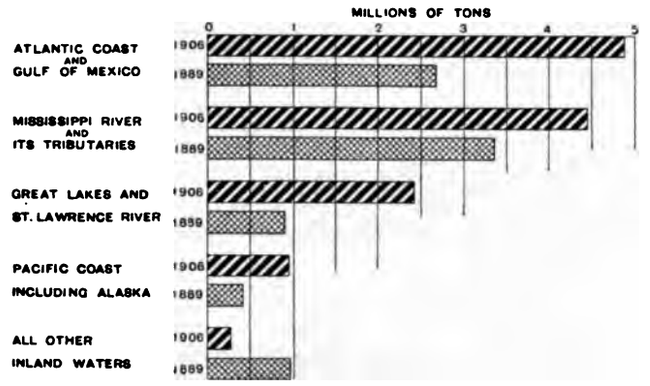
The limitation in size as established by the tonnage can be applied under all conditions, and the rule for the exclusion of the small craft was followed in all sections of the country. At the census of 1889 the rather indefinite term "of over 5 tons burden" was used to designate the minimum limit in the size of the vessels to be included, and while it is believed that this was construed to mean 5 "gross" tons, there is no positive statement that this rule was followed in the canvass for all sections of the country. To avoid the possibility of any misunderstanding, the term "5 tons net register" was adopted for the census of 1906.

TABLE 30.—NUMBER, GROSS TONNAGE, AND VALUE OF DIFFERENT CLASSES OF VESSELS, BY DIVISIONS: 1906 AND 1889.

DIVISION AND CLASS.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Average tonnage per vessel.	Average value per ton.	Average value per vessel.
Total	1906	37,321	12,893,429	$507,973,121	345	$39	$13,611
	1889	30,485	8,359,135	206,992,352	274	25	6,790
Steam	1906	9,927	4,059,521	386,772,727	409	95	38,962
	1889	5,603	1,710,073	131,567,427	305	77	23,482
Sail	1906	7,131	1,704,277	56,206,145	239	33	7,882
	1889	7,945	1,675,706	53,192,972	211	32	6,695
Unrigged	1906	20,263	7,129,631	64,994,249	352	9	3,208
	1889	16,937	4,973,356	22,231,953	294	4	1,313
Atlantic coast and Gulf of Mexico	1906	20,032	4,851,421	273,105,915	242	56	13,633
	1889	12,238	2,658,445	116,042,062	217	44	9,482
Steam	1906	5,413	1,457,894	193,926,327	269	133	35,826
	1889	2,536	741,770	65,518,640	292	88	25,835
Sail	1906	5,920	1,132,905	37,520,903	191	33	6,338
	1889	6,277	1,293,192	42,685,982	206	33	6,800
Unrigged	1906	8,699	2,260,622	41,658,685	260	18	4,789
	1889	3,425	623,483	7,837,440	182	13	2,288
Pacific coast (including Alaska)	1906	2,537	977,687	76,622,633	385	78	30,202
	1889	1,635	419,157	21,824,040	256	52	13,348
Steam	1906	1,066	518,107	60,440,145	486	117	56,698
	1889	465	160,293	14,707,355	345	92	31,758
Sail	1906	666	305,283	11,533,171	458	38	17,317
	1889	681	195,508	6,231,340	287	32	9,150
Unrigged	1906	805	154,297	4,649,317	192	30	5,776
	1889	489	63,356	825,345	130	13	1,688
Great Lakes and St. Lawrence river	1906	2,990	2,392,863	130,805,640	800	55	43,748
	1889	2,737	920,294	48,580,174	336	53	17,749
Steam	1906	1,676	1,915,786	116,983,812	1,143	61	69,799
	1889	1,467	595,813	40,868,824	406	69	27,859
Sail	1906	531	265,571	7,135,271	500	27	13,437
	1889	962	185,081	4,238,850	192	23	4,406
Unrigged	1906	783	211,506	6,686,557	270	32	8,540
	1889	308	139,400	3,472,500	453	25	11,274
Mississippi river and its tributaries	1906	9,622	4,411,967	22,852,142	459	5	2,375
	1889	7,300	3,364,610	14,407,162	461	4	1,974
Steam	1906	1,435	146,227	13,196,770	102	90	9,196
	1889	972	192,974	9,622,608	199	50	9,900
Unrigged	1906	8,187	4,265,740	9,655,372	521	2	1,179
	1889	6,328	3,171,636	4,784,554	501	2	756
All other inland waters	1906	2,140	259,491	4,586,791	121	18	2,143
	1889	6,575	996,629	6,138,914	152	6	934
Steam	1906	337	21,507	2,225,673	64	103	6,604
	1889	163	19,223	790,000	118	41	4,847
Sail	1906	14	518	16,800	37	32	1,200
	1889	25	1,925	36,800	77	19	1,472
Unrigged	1906	1,789	237,466	2,344,318	133	10	1,310
	1889	6,387	975,481	5,312,114	153	5	832

The average gross tonnage per vessel increased from 274 in 1889 to 345 in 1906, but there is a great variety of craft represented by the figures on which these averages are based. While the average tonnage for the different classes shown in the table is of greater significance, each class embraces a large number of small craft that are used neither for freight nor for passenger traffic, and which are not usually considered in connection with the average tonnage or the average value per vessel or per ton of the merchant marine. These craft form a much smaller proportion of the vessels operating on the Great Lakes than of those for the other waters. This circumstance and the recent construction of a number of vessels of large tonnage designed especially for a particular class of freight have greatly increased the average size of the vessels in this section, so that it is now considerably larger than the general average for any of the other divisions.

DIAGRAM 6.—*Gross tonnage of all vessels, by divisions: 1906 and 1889.*



The large tonnage shown for the average vessel on the Mississippi river is due to the inclusion of the unrigged craft. The waters in which the unrigged craft are to operate and the class of freight to be carried necessarily control their size and to some extent the material to be used in their construction. Of the 4,265,740 gross tonnage reported for these craft operating on the Mississippi river and its tributaries, only 17,401, or less than 1 per cent, were iron and steel. In many instances the tonnage reported for these craft was not the result of actual measurement, but was an estimate. Considering all craft of this group, the largest average tonnage is shown for the Mississippi river and the largest average value for the Great Lakes. Large numbers of the barges on the Mississippi river and its tributaries are used to carry coal down the stream and are constructed so as to have the maximum tonnage, but with no intention of use on rough water, such as must be encountered by craft on the Great Lakes and other waters.

The aggregate tonnage for all vessels or the average tonnage per vessel conveys only an indefinite idea of the actual number of the large and small vessels. The relative importance of craft of different sizes can be ascertained only by arranging them in groups according to their gross tonnage; this has been done in Table 31.

Considering the total for all classes of craft reported at the census of 1906, it appears that the largest number, 10,886, is included in the group of from 5 to 49 gross tons. The largest total gross tonnage, 4,132,702, is shown for the group of from 1,000 to 2,499 tons, which includes only 3,350 vessels, the average tonnage being 1,234. The 124 vessels of 5,000 tons or over, representing the largest vessels reported, had a total tonnage of 865,385 and an average tonnage of 6,979.

While 65 per cent of the steam vessels are comparatively small craft of less than 100 gross tons, such craft represent only 4.8 per cent of the total steam tonnage; the large steam vessels, those of 1,000 tons or more, on the other hand, form only 10.3 per cent of the number, but represent 75.4 per cent of the total tonnage. There were 120 steam vessels of 5,000 or more tons each, the average tonnage of which was 7,042.

Among the sail vessels, craft of less than 100 gross tons constituted 69.3 per cent of the entire number, but represented only 7.1 per cent of the gross tonnage; while the large sail vessels of 1,000 tons or over, although constituting but 6.3 per cent of the number, represented 45.9 per cent, or nearly one-half of the tonnage.

The table is also significant in that it shows the importance of the unrigged craft of large tonnage. Of the 20,263 craft of this class, 26.4 per cent were of more than 500 tons, but the tonnage formed 62.3 per cent of the total tonnage for the class.

With the exception of 49 vessels on the Pacific coast all the vessels of 2,500 tons or over were reported from the Atlantic coast and Gulf of Mexico and from the Great Lakes district. The largest number of such vessels reported was among the steam vessels on the Great Lakes, and the next largest among the sail vessels on the same waters, the large vessels of the latter class being represented principally by the schooner barges. No vessels of this size were reported on the Mississippi river, but there were 4,332 vessels, with a tonnage of from 500 to 2,499, constituting 45 per cent of the total number reported in this district. Of these 4,332 vessels, however, only 63 were steam, the remainder being comprised principally of the numerous coal barges which figure so prominently in the traffic of that division.

Of the vessels on the Atlantic coast, 9,542, or 47.6 per cent, were of less than 100 tons; on the Pacific coast, 1,296 vessels, or 51.1 per cent; on the Great Lakes, 1,263, or 42.2 per cent; on the Mississippi river, 2,065, or 21.5 per cent; on the canals and other inland waters of New York state, 298, or 18.1 per cent; and on all other inland waters, 228, or 46.3 per cent. Excluding these small vessels there are altogether on the Atlantic coast 10,490 vessels, averaging 435 tons; on the Pacific coast, 1,241 vessels, with an average tonnage of 754; on the Great Lakes, 1,727 vessels, with an average tonnage of 1,358; and on the Mississippi river, 7,557 vessels, with an average tonnage of 573.

TABLE 31.—VESSELS GROUPED ACCORDING TO GROSS TONNAGE, BY DIVISIONS: 1906.

DIVISION AND CLASS.	TOTAL.		5 TO 49 TONS.		50 TO 99 TONS.		100 TO 199 TONS.		200 TO 299 TONS.		300 TO 399 TONS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
United States	37,321	12,893,429	10,886	207,660	3,806	272,358	7,712	1,094,373	3,452	840,078	1,843	631,247
Steam	9,927	4,059,521	5,068	92,344	1,386	101,886	1,034	147,917	418	102,032	257	89,640
Sail	7,131	1,704,277	4,255	72,734	685	47,731	353	51,219	242	60,491	205	71,241
Unrigged	20,263	7,129,631	1,563	42,582	1,735	122,741	6,325	895,237	2,792	677,555	1,381	470,366
Atlantic coast and Gulf of Mexico	20,032	4,851,421	7,413	133,812	2,129	151,754	3,839	549,840	2,127	513,836	1,429	486,094
Steam	5,413	1,457,894	3,019	55,988	763	55,734	590	83,092	225	54,840	107	37,370
Sail	5,920	1,132,905	3,792	63,191	592	40,928	299	42,889	169	41,971	137	47,615
Unrigged	8,699	2,260,622	602	14,633	774	55,092	2,950	423,859	1,733	417,025	1,185	401,109
Pacific coast (including Alaska)	2,537	977,687	976	18,809	320	22,546	283	40,050	155	37,591	118	40,612
Steam	1,066	518,107	459	7,400	104	7,862	116	17,459	62	15,121	60	20,512
Sail	666	305,283	257	6,151	52	3,751	18	2,662	24	6,298	30	10,429
Unrigged	805	154,297	260	5,258	164	10,933	149	19,929	69	16,172	28	9,671
Great Lakes and St. Lawrence river	2,990	2,392,863	843	18,096	420	28,899	307	44,130	199	49,117	159	58,549
Steam	1,676	1,915,786	578	12,569	213	15,319	86	12,787	49	11,792	49	17,198
Sail	531	265,571	196	3,266	39	2,869	34	5,459	49	12,222	38	13,197
Unrigged	783	211,506	69	2,261	168	10,711	187	25,884	101	25,103	72	28,154
Mississippi river and its tributaries	9,622	4,411,967	1,383	31,759	682	48,654	1,912	295,536	784	196,099	105	34,990
Steam	1,435	146,227	788	12,346	265	19,991	183	26,898	76	18,839	39	13,893
Unrigged	8,187	4,265,740	595	19,413	417	28,663	1,729	268,638	708	177,260	66	21,097
Canals and other inland waters of New York state	1,648	209,152	105	1,990	193	16,244	1,153	136,313	174	40,676	1	300
Steam	151	14,127	80	1,523	17	1,145	45	5,924	4	1,006	1	300
Sail	13	495	9	103	2	183	2	209				
Unrigged	1,484	194,530	16	364	174	14,916	1,106	130,180	170	39,670		
All other inland waters	492	50,339	166	3,194	62	4,261	218	28,504	13	2,759	31	10,702
Steam	186	7,380	144	2,518	24	1,835	14	1,757	2	434	1	367
Sail	1	23	1	23								
Unrigged	305	42,936	21	653	38	2,426	204	26,747	11	2,325	30	10,335

DIVISION AND CLASS.	400 TO 499 TONS.		500 TO 999 TONS.		1,000 TO 2,499 TONS.		2,500 TO 4,999 TONS.		5,000 TONS AND OVER.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
United States	1,552	677,488	4,175	2,654,477	3,350	4,132,702	421	1,517,661	124	865,385
Steam	215	96,145	527	366,661	548	924,492	354	1,293,364	120	845,040
Sail	224	100,797	718	517,208	388	581,046	57	181,465	4	20,345
Unrigged	1,113	480,546	2,930	1,770,608	2,414	2,627,164	10	42,832		
Atlantic coast and Gulf of Mexico	869	380,276	1,441	997,370	585	852,007	169	556,311	31	230,121
Steam	115	51,113	249	176,096	184	289,359	131	429,399	30	224,903
Sail	155	69,299	485	356,998	262	380,716	28	84,080	1	5,218
Unrigged	599	259,864	707	464,276	139	181,932	10	42,832		
Pacific coast (including Alaska)	98	44,079	361	243,497	177	271,166	34	109,680	15	149,657
Steam	50	22,324	105	71,257	62	99,677	33	106,838	15	149,657
Sail	30	13,804	156	108,095	98	151,251	1	2,842		
Unrigged	18	7,951	100	64,145	17	20,238				
Great Lakes and St. Lawrence river	148	66,770	279	193,546	339	596,479	218	851,670	78	485,607
Steam	28	12,757	115	82,850	293	522,907	190	757,127	75	470,480
Sail	39	17,694	77	52,115	28	49,079	28	94,543	3	15,127
Unrigged	81	36,319	87	58,581	18	24,493				
Mississippi river and its tributaries	424	181,044	2,087	1,215,430	2,245	2,408,455				
Steam	21	9,482	56	34,824	7	9,954				
Unrigged	403	171,562	2,031	1,180,606	2,238	2,398,501				
Canals and other inland waters of New York state	11	4,400	7	4,634	4	4,595				
Steam			2	1,634	2	2,595				
Sail										
Unrigged	11	4,400	5	3,000	2	2,000				
All other inland waters	2	919								
Steam	1	469								
Sail										
Unrigged	1	450								

VALUATION OF VESSELS.

The census of transportation by water in 1880 embraced only steam vessels, and their valuation was secured through the United States local inspectors wherever the services of these officials were available. The estimated valuation was based upon the condition and age of the hull and boilers and the capacity of the

engines. Where there was no inspection the valuation was obtained from the owners or experts. The figures, however, are so meager that they have not been used in comparison with those of the later censuses.

In 1889 and 1906, the two years for which a regular census of transportation by water was taken, the commercial valuation of vessels was asked for, but in order to comprehend the comparative value of the data it is necessary to understand the varying conditions under which the figures were secured.

The report on water transportation for 1889 states that the valuation was high or low according to the basis upon which the information was given. In some instances the value was reported as the vessel's cost; in other cases the basis was what would be realized by sale; and in still others the valuation was given with the belief that the figures might be used as a basis for taxation. The report for 1889 also contains a comparative table from data collected by the Commissioner of Navigation showing for the years 1886 to 1890, inclusive, the insurance valuation of vessels on the Great Lakes. The information contained in this table was taken from Lloyd's Inland Register. It is doubtful if the variations in reporting the valuation of vessels in 1889 were wholly eliminated at the census of 1906. In fact the commercial valuation of a vessel or a fleet is capable of such an honest difference in the understanding of its meaning as might make comparative figures of valuation of vessels for the two censuses unreliable. If, for instance, commercial valuation is based upon the earning capacity of a vessel or fleet, the value might be subject to great fluctuations from year to year and would largely represent the business success of the enterprise. It seems manifestly unfair to report the commercial valuation as the cost of the vessels, since this fails to give proper consideration to the important elements of age and condition. The amount that would be realized by sale is also an unreliable and unfair basis and resolves itself into the question of supply and demand at the time the inquiry is made. An insurance valuation, the basis of a premium required by the underwriters, might in consequence be excessive. It may safely be assumed that the valuation given by owners, who thought the information might be made the basis of taxation, would be low, but it is not believed there are many who now take such a false and narrow view of the use of Government statistics.

A correct commercial valuation seems difficult to define positively, so as to eliminate all the objections here referred to, but no fair basis seems possible without giving due weight to the age and condition of the vessel as a whole, including boilers and engines, if a steamer, and spars and sails, etc., if a sail vessel, together with proper consideration of the cost and earning capacity. Such a basis was attempted at the census of 1906, but the success of the effort is uncertain. It appears impossible also to determine the extent of the variation in reporting the valuation of vessels at the two censuses. The tables and analysis which follow in illustration of this subject are submitted, therefore, with this understanding.

TABLE 32.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CHARACTER OF CONSTRUCTION: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Aggregate	1906	37,321	12,893,429	$507,973,121	1 979	3,276,723	$306,229,289	35,247	9,581,348	$199,135,582	95	35,358	$2,608,250
	1889	30,485	8,359,135	206,992,352	548	525,218	50,918,319	29,834	7,793,259	153,552,913	103	40,658	2,521,120
Steam	1906	9,927	4,059,521	386,772,727	1,674	2,916,517	289,689,438	8,197	1,119,459	95,026,589	56	23,545	2,056,700
	1889	5,603	1,710,073	131,567,427	534	515,003	50,153,519	5,033	1,173,860	79,538,108	36	21,210	1,875,800
Freight and passenger	1906	3,615	3,411,588	286,218,089	908	2,623,551	238,475,331	2,690	768,857	46,634,758	17	19,180	1,108,000
	1889	2,429	1,290,552	90,999,834	296	413,411	38,802,099	2,111	856,979	50,589,735	22	20,162	1,608,000
Tugs and other towing vessels.	1906	3,079	261,375	39,062,249	420	83,902	14,574,417	2,649	176,513	24,383,332	10	960	104,500
	1889	1,950	146,447	17,364,413	107	9,157	1,761,800	1,837	137,054	15,580,813	6	236	21,800
Ferryboats	1906	536	261,073	29,578,380	156	151,406	19,839,598	379	109,253	9,715,782	1	414	23,000
	1889	456	146,104	10,442,750	60	40,925	3,976,500	396	105,179	6,466,250	.....	.....	.....
Yachts	1906	2,176	82,275	24,281,861	134	38,294	12,524,020	2,016	41,643	11,036,641	26	2,338	721,200
	1889	230	13,586	3,858,810	25	4,864	1,649,720	202	8,369	2,074,090	3	353	135,000
All other	1906	521	43,210	7,632,148	56	19,364	4,276,072	463	23,193	3,256,076	2	653	100,000
	1889	538	113,384	8,901,620	46	46,646	3,963,400	487	66,279	4,827,220	5	459	111,000
Sail	1906	7,131	1,704,277	56,206,145	131	227,959	10,598,751	6,973	1,470,656	45,165,894	27	5,662	441,500
	1889	7,945	1,675,706	53,192,972	14	10,215	764,800	7,864	1,646,043	51,782,852	67	19,448	645,320
Freight and passenger	1906	5,181	1,672,862	51,415,756	110	225,613	9,832,451	5,069	1,442,556	41,347,305	2	4,693	236,000
	1889	6,863	1,641,846	49,165,617	8	9,734	554,500	6,795	1,612,875	47,996,047	60	19,237	615,070
Yachts	1906	1,594	24,155	4,169,253	21	2,346	766,300	1,549	20,954	3,202,453	24	855	200,500
	1889	653	15,040	2,750,755	6	481	210,300	644	14,487	2,519,955	3	72	20,500
All other	1906	356	7,260	621,136	.....	.....	.....	355	7,146	616,136	1	114	5,000
	1889	429	18,820	1,276,600	.....	.....	.....	425	18,681	1,266,850	4	139	9,750
Unrigged	1906	20,263	7,129,631	64,994,249	174	132,247	5,941,100	20,077	6,991,233	58,943,099	12	6,151	110,050
	1889	[1] 16,937	4,973,356	22,231,953	.....	.....	.....	[1] 16,937	4,973,356	22,231,953	.....	.....	.....

[1] Includes a few craft of metal construction which were not segregated in 1889.

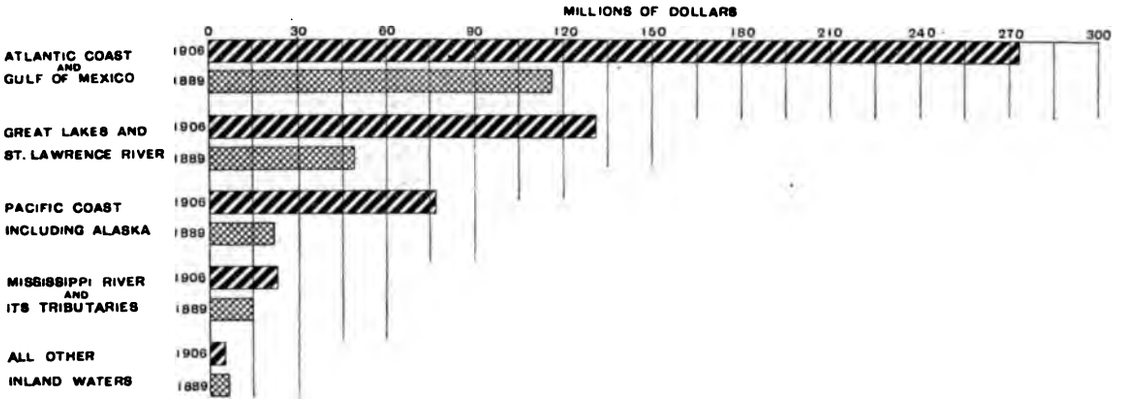
During the period covered by the table the total valuation of all kinds of vessels increased $300,980,769, or 145.4 per cent. Of the three general classes of vessels, the increase in the actual valuation of steamers was the largest, $255,205,300, or 194 per cent, representing 84.8 per cent of the total increase for all kinds of vessels. The value of sailing vessels increased $3,013,173, or 5.7 per cent, and that of unrigged craft $42,762,296, or 192.3 per cent.

Of steam craft, under which are also included any vessels propelled by gasoline engines, electric power, etc., those classed as freight and passenger were by far the most important, their valuation constituting 74 per cent of the total for all kinds of steam vessels in 1906 and 69.2 per cent in 1889, while in the former year it represented 56.3 per cent and in the latter year 44 per cent of the total valuation for all vessels—steam, sail, and unrigged. The actual increase in the valuation of the freight and passenger vessels was $195,218,255, and the average value per vessel increased $41,711, or 111.3 per cent. This large increase was due entirely to the gain in the number of iron and steel vessels, as there was a decrease in the value of vessels of wood or of composite construction. In addition to the fact that metal construction costs more per ton than wood, there has been since 1889 a great advance among the merchant navies of the world, not only in the size of the vessels, in which American freight and passenger steam vessels showed an average increase of 413 tons, or 77.8 per cent, but also in furnishings and speed. This latter element constitutes a very important factor in the cost of the modern steamship, but neither the census of 1889 nor that of 1906 made any report in reference to this feature of construction. Lloyd's Register of American Shipping, however, contains the name of but one vessel of American ownership built prior to 1889 having a sustained speed of over 16 knots—a small 17-knot steamer of 1,440 gross tons—whereas since that date, including those built during 1906, there have been added to the American merchant marine 38 vessels having a sustained speed of from 16½ to 20 knots and representing a total of 172,404 gross tons.[1]

Tugboats increased $21,697,836 in value, or 125 per cent, those of metal construction showing the largest gain. The average size of tugs varied but little at the two censuses. The value of ferryboats increased $19,135,630, or 183.2 per cent, the increase being principally for those of metal construction. Although the average size of vessels of this class has increased since the census of 1889, it has not been sufficient to account for the gain in valuation, which no doubt represents the replacing of old and worn-out vessels by those of more expensive type, as well as the addition of many new boats of a more modern and costly construction. In fact the conditions governing the demand for better vessels among passenger and freight craft apply equally to ferryboats, which may be said to be their coadjutors.

[1] Lloyd's Register of American Shipping, 1907–8.

DIAGRAM 7.—VALUE OF ALL VESSELS, BY DIVISIONS: 1906 AND 1889.



Yachts, both steam and sailing, may be treated together, since they are apart from the commercial or the earning tonnage of the country but represent the demands and taste of individual owners. Of these vessels, the valuation of steam yachts showed an increase of $20,423,051, or 529.3 per cent, against an increase of but $1,418,498, or 51.6 per cent, for those relying on sails for propulsion. The great gain in steam yachts is further illustrated by a comparison of the gain in tonnage, those using steam showing an increase of 68,689 tons, or 505.6 per cent, compared with a gain of 9,115 tons, or only 60.6 per cent, for those dependent upon sails. Both kinds of yachts show marked increases for composite construction, tugboats being the only other class of vessels to show any definite gain in this respect.

"All other" craft embraces the great variety of vessels not covered by the specific classes referred to, such as the numerous boats used for taking out pleasure parties, dredges, pile drivers, police boats, pilot boats, vessels used for scientific purposes, etc. The value of steam vessels of this class decreased $1,269,472, or 14.3 per cent, and sailing vessels showed a decrease of $655,464, or 51.3 per cent. The steam vessels included under this classification decreased in number 17, or 3.2 per cent, and 70,174, or 61.9 per cent, in tonnage; these losses, while seemingly inconsistent with the gain in other classes of steam vessels, are due probably to the difference in the character of the vessels included under this classification at the two censuses.

There was an increase of $2,250,139, or 4.6 per cent, in the actual value of freight and passenger sailing vessels, and a gain of 31,016 tons, or 1.9 per cent, in tonnage, but a decrease of 1,682, or 24.5 per cent, in their number. There was a marked falling off, however, in the relative importance of this class of vessels, as in 1906 they represented but 10.1 per cent of the total valuation for all kinds of craft, against 23.8 per cent in 1889. These figures, when considered in connection with the increase shown for steam craft, indicate the extent to which the latter have superseded the sailing vessel.

The value of unrigged craft increased $42,762,296, or 192.3 per cent, which is entirely out of proportion to the increase in number and tonnage, and indicates a greater value per vessel. The average value per vessel increased $1,895, or 144.3 per cent. The census of 1906 included a large number of undocumented dredges of considerable cost, statistics for which were not secured at the census of 1889, and to this fact is due much of the gain shown in value. There has been also a considerable decrease in the number of canal boats and an increase in the number of large barges, resulting to a great extent from the decreasing use of the old-time sailing ships, many of which have been reduced to mere hulks of large capacity, dependent upon the towboat for propelling power.

The average value per vessel and per gross ton, shown in Table 33, for the different classes of craft as reported at the last two censuses, are of interest in connection with the figures in Table 32.

TABLE 33.—AVERAGE GROSS TONNAGE AND VALUE PER VESSEL AND AVERAGE VALUE PER TON: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.
Aggregate	1906	345	$13,611	$39	1,656	$154,739	$93	272	$5,650	$21	372	$27,455	$74
	1889	274	6,790	25	958	92,917	97	261	5,147	20	395	24,477	62
Steam	1906	409	38,962	95	1,742	173,052	99	137	11,593	85	420	36,727	87
	1889	305	23,482	77	964	93,920	97	233	15,803	68	589	52,106	88
Freight and passenger	1906	944	79,175	84	2,889	262,638	91	286	17,336	61	1,128	65,176	58
	1889	531	37,464	71	1,397	131,088	94	406	23,965	59	916	73,091	80
Tugs and other towing vessels	1906	85	12,687	149	200	34,701	174	67	9,205	138	96	10,450	109
	1889	75	8,905	119	86	16,465	192	75	8,482	114	39	3,633	92
Ferryboats	1906	487	55,184	113	971	127,177	131	288	25,635	89	414	23,000	56
	1889	320	22,901	71	682	66,275	97	266	16,329	61	.....	.....	.....
Yachts	1906	38	11,159	295	286	93,463	327	21	5,475	265	90	27,738	308
	1889	59	16,777	284	195	65,989	339	41	10,268	248	118	45,000	382
All other	1906	83	14,649	177	346	76,358	221	50	7,033	140	327	50,000	153
	1889	211	16,546	79	1,014	86,161	85	136	9,912	73	92	22,200	242
Sail	1906	239	7,882	33	1,740	80,906	46	211	6,477	31	210	16,352	78
	1889	211	6,695	32	730	54,629	75	209	6,585	31	290	9,632	33
Freight and passenger	1906	323	9,924	31	2,051	89,386	44	285	8,157	29	2,347	118,000	50
	1889	239	7,164	30	1,217	69,313	57	237	7,063	30	321	10,251	32
Yachts	1906	15	2,616	173	112	36,490	327	14	2,067	153	36	8,354	235
	1889	23	4,212	183	80	35,050	437	22	3,913	174	24	6,833	285
All other	1906	20	1,745	86	.....	.....	.....	20	1,736	86	114	5,000	44
	1889	44	2,976	68	.....	.....	.....	44	2,981	68	35	2,438	70
Unrigged	1906	352	3,208	9	760	34,144	45	348	2,936	8	513	9,171	18
	1889	294	1,313	4	.....	.....	.....	[1] 294	[1] 1,313	[1] 4	.....	.....	.....

[1] Includes a few craft of metal construction which were not segregated in 1889.

VALUE OF LAND PROPERTY.

The $507,973,121 reported as the commercial value of the vessels and craft covered by the census represents only a part of the capital devoted to the water transportation interests of the United States. The value of all land, wharves, warehouses and other buildings, fixtures, machinery, implements, tools, cash on hand, and all property other than the vessels and their outfits, but incident to their operation, should be theoretically included in the capital for the industry. As a matter of fact, although most of the large shipping companies own their wharves, a large proportion of the

land property is not owned by the transportation companies, and these companies could give no information concerning its value. Much of it is owned by local governments, or by dock companies, railroads, individuals, corporations, and others, that do not own or operate craft of any kind. While the capital invested in such property is employed primarily in water transportation, it also represents other interests, such as railroad traffic, storage and mercantile transactions, and it would be difficult, and in many cases impracticable, to make a segregation which would show the amount that could be considered as devoted to water transportation. To obtain any information on the subject would necessitate a special canvass of interests not represented by the owners of water craft. As this would add greatly to the expense of the census and the results would be of doubtful value, the inquiry concerning land property was restricted to that owned by the shipping companies. But many companies are engaged in transportation by both land and water, and others operate vessels in connection with a mining or manufacturing business. In such cases it was impracticable to separate the value of the property devoted to water transportation, and no amounts were reported.

It is the practice of the shipping companies operating out of New York to lease their dock facilities from the city. The lease may require the lessee to erect, at his own expense, all houses that may be necessary, subject to the approval of the Department of Docks and Ferries, the entire property reverting to the city on the expiration of the lease. As a similar practice prevails to some extent in other cities, the Census schedule required the value of leases or annual rentals to be reported separately. The answer to this inquiry included the amount of the annual rent and a proportion of the cost of the buildings, etc., if erected at the expense of the lessee.

Under the foregoing conditions it was impossible to obtain satisfactory data for land property, therefore the statistics are defective, and are not included in the tables. The value of the land property reported in answer to this inquiry amounted, however, to $80,912,947. This includes the value of the wharves and docks incident to the operation of the municipal ferries in New York and Boston, but does not include other wharves and docks owned by these or other cities. The leases and annual rentals were valued at $7,642,259.

CHARACTER OF PROPULSION AND HORSEPOWER.

The period between the census of transportation by water for 1889 and that for 1906 witnessed a great advance in the marine engine. Probably the most notable achievement is the success of the turbine engine and its adaptation to vessels of the largest type. The gasoline engine has also developed during the period, not only because of the small space required for the equipment and on account of its cleanliness, but by reason of the low cost of installation, cheapness of gasoline, and small expense for employees to operate it. The use of oil as a fuel appears to be growing in favor, partly because of the decrease in the number of stokers, coal trimmers, etc., which the use of this fuel makes possible. The internal combustion engine is rapidly developing, and if the gas engine meets the expectations of its many advocates it will revolutionize power in the maritime world.

Although electricity was reported as a means of propulsion on but few small yachts, it has an extensive and growing use on shipboard as a subsidiary power. Some idea of the extent to which electricity is employed in the latter capacity can be obtained from the equipment of the new Cunard liner *Mauretania*, on which the generating plant is said to consist of four sets of turbo-generators, each capable of supplying 4,000 amperes at 110 volts when run at a speed of 1,200 revolutions per minute. The steampower required for this would drive a 10,000-ton cargo steamer at a speed of 10 knots.[1]

As the census of transportation by water for 1906 was the first at which the character and amount of horsepower was secured, it is impossible to present comparative figures which will show the actual growth of horsepower in the merchant marine. The gain, however, in steam tonnage from 1,710,073 tons in 1889 to 4,059,521 tons in 1906, an increase of 137.4 per cent, is significant of what might be expected in the growth of horsepower. The average horsepower per ton in 1906 was eighty-five one-hundredths of a horsepower. Assuming that this average per ton was the same in 1889, that census would have shown a total of 1,453,562 horsepower, which compared with the total for 1906 would give an increase of 1,998,183 horsepower.

[1] American Marine Engineer, January, 1908.

TABLE 34.—CHARACTER OF POWER AND PROPULSION, BY DIVISIONS: 1906.

DIVISION.	Number of vessels.	Total horsepower.	SCREW.								
			Steam.			Gasoline.			All other.		
			Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.
Total	9,927	3,451,745	5,160	3,424,972	2,717,649	2,785	46,159	67,152	7	92	88
Atlantic coast and Gulf of Mexico	5,413	1,758,378	2,907	1,135,578	1,413,088	1,946	33,655	45,369	5	72	54
Pacific coast (including Alaska)	1,066	445,717	507	408,849	357,503	330	6,251	10,372			
Great Lakes and St. Lawrence river	1,676	982,555	1,396	1,862,244	912,947	219	3,122	5,687	1	5	8
Mississippi river and its tributaries	1,435	236,969	130	6,652	18,326	226	2,182	4,098			
Canals and other inland waters of New York state	151	17,767	107	8,109	10,324	30	521	812	1	15	16
All other inland waters	186	10,359	113	3,540	5,461	34	428	814			

DIVISION	STERN WHEEL.						SIDE WHEEL.						ALL OTHER.		
	Steam.			Gasoline.			Steam.			Gasoline.			Steam.		
	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.
Total	1,055	193,208	247,020	351	4,592	5,747	543	389,327	413,152	19	247	305	7	924	632
Atlantic coast and Gulf of Mexico	157	17,226	19,557	26	395	533	368	270,831	279,675	2	22	30	2	115	62
Pacific coast (including Alaska)	184	67,364	54,271	7	175	208	34	35,394	23,246	4	74	117			
Great Lakes and St. Lawrence river	6	859	880	2	24	13	51	49,339	62,985				1	193	35
Mississippi river and its tributaries	678	104,476	169,210	312	3,929	4,911	72	28,221	39,731	13	151	158	4	616	535
Canals and other inland waters of New York state	5	562	265				8	4,920	6,350						
All other inland waters	25	2,721	2,837	4	69	82	10	622	1,165						

TABLE 35.—*Vessels propelled by steam, gasoline, and electricity, and per cent each is of total: 1906.*

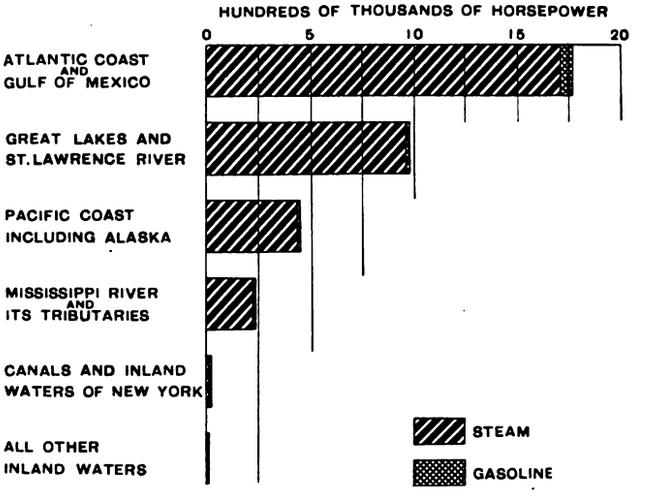
	Total.	Steam.	Gasoline.	Electric.	PER CENT OF TOTAL.		
					Steam.	Gasoline.	Electric.
Number of vessels	9,927	6,765	3,155	7	68.1	31.8	0.1
Screw	7,952	5,160	2,785	7	64.9	35.0	0.1
Stern wheel	1,406	1,055	351		75.0	25.0	
Side wheel	562	543	19		96.6	3.4	
All other	7	7			100.0		
Gross tonnage	4,059,521	4,008,431	50,998	92	98.7	1.3	(1)
Horsepower	3,451,745	3,378,453	73,204	88	97.9	2.1	(1)

[1] Less than one-tenth of 1 per cent.

Of the total horsepower reported in 1906, 3,378,453, or 97.9 per cent, was steam and 73,204, or 2.1 per cent, was from the use of gasoline. The 88 horsepower reported as "electric" is in the shape of storage batteries on 7 small yachts.

The Atlantic coast and Gulf of Mexico led in the amount of horsepower reported, with 50.9 per cent, or slightly more than half the total, while the other districts came in the following order: The Great Lakes and St. Lawrence river, with 28.5 per cent of the total; the Pacific coast, with 12.9 per cent; the Mississippi river and its tributaries, with 6.9 per cent; the canals and other inland waters of New York state, with five-tenths of 1 per cent; and all other inland waters, with three-tenths of 1 per cent.

DIAGRAM 8.—*Horsepower of steam vessels: 1906.*



In respect to the character of propulsion, 7,952, or 80.1 per cent, of the vessels were equipped with the screw propeller, which was first applied in England in 1837 and in the United States in 1841.[1] Vessels equipped with the stern wheel ranked second in number and had their greatest use on rivers, 70.4 per cent being located in the Mississippi river district alone. This type of craft represented 14.2 per cent of the total number of all classes of vessels using power. Next

[1] Tenth Census, Report on Shipbuilding Industry.

in order came those equipped with the side wheel, forming 5.7 per cent of the total number, which indicates the limited use of this kind of propulsion, the first to which steampower was applied.

There is a great disproportion between the number of vessels propelled by steam and by gasoline engines when compared with their tonnage and horsepower. Vessels reporting the use of steampower for propulsion numbered 6,765, or 68.1 per cent of the total, but their tonnage was 4,008,431, or 98.7 per cent of the total tonnage for all classes, and their horsepower 3,378,453, or 97.9 per cent of the total. Gasoline boats, on the other hand, were reported to the number of 3,155, or 31.8 per cent of the total number for all classes of vessels, but their tonnage was only 50,998, or 1.3 per cent of the total, and their horsepower 73,204, or 2.1 per cent of the total. While the use of gasoline is largely confined to small craft, there are some fairly large vessels equipped with engines of this class having a capacity of several hundred horsepower. The expense of operating gasoline engines of large power together with the element of danger have undoubtedly been strong factors in confining their use to small vessels. The fact should not be overlooked that the Census inquiry was confined to vessels of not less than 5 net tons, so that the hundreds of boats of smaller tonnage using the gasoline engine do not appear in this report. Of the total tonnage shown in these tables, 3,471,223 tons, or 85.5 per cent, was propelled by the screw propeller; 389,574 tons, or 9.6 per cent, by the side wheel; 197,800 tons, or 4.9 per cent, by the stern wheel; and 924 tons, or less than one-tenth of 1 per cent, by other methods. The horsepower reported for the several types was as follows: Screw propeller, 2,784,889 horsepower, or 80.7 per cent of the total; side wheel, 413,457 horsepower, or 12 per cent; stern wheel, 252,767 horsepower, or 7.3 per cent; and for all other types, 632 horsepower, or less than one-tenth of 1 per cent.

The freight and passenger vessels reported 65.9 per cent of the total horsepower; tugs and towing vessels, 18.7 per cent; ferryboats, 7.7 per cent; yachts, 5.9 per cent; and all other craft, 1.8 per cent. The figures for passenger and freight vessels show that 76.5 per cent were fitted with screw propellers, 15.6 per cent with stern wheels, while 7.9 per cent were side wheelers. Among tugs and towing vessels, 78.9 per cent used screw propellers, 20.3 per cent stern wheels, and nine-tenths of 1 per cent side wheels. Of the ferryboats, 35.1 per cent were equipped with screw propellers, 21.1 per cent with stern wheels, 42.5 per cent with side wheels, while the equipment of 7 was of miscellaneous character, representing 1.3 per cent of the total number.

TABLE 36.—CHARACTER OF PROPULSION AND HORSEPOWER OF STEAM VESSELS, BY OCCUPATION: 1906.

OCCUPATION.	CHARACTER OF PROPULSION.					HORSEPOWER OF ENGINES.			
	Total.	Screw (number).	Side wheel (number).	Stern wheel (number).	All other (number).	Total.	Steam.	Gasoline.	All other.
Total	9,927	7,952	562	1,406	7	3,451,745	3,378,453	73,204	88
Freight and passenger	3,615	2,766	285	564	.....	2,275,712	2,255,295	20,417	.....
Tugs and other towing vessels	3,079	2,428	27	624	.....	645,286	637,950	7,336	.....
Ferryboats	536	188	228	113	7	265,659	264,414	1,245	.....
Yachts	2,176	2,093	7	76	.....	201,983	162,032	39,871	80
All other	521	477	15	29	.....	63,105	58,762	4,335	8

INCOME.

The only financial statistics included in this census relate to the value of the vessels and land property, the salaries and wages paid, and the gross income derived from the operation of the vessels during the census year. With the exception of some of the craft owned by municipalities or other local governments and those used exclusively for pleasure, such as yachts, all the craft included in the census were operated for the purpose of producing revenue. A small amount of revenue was also reported for yachts, but it represents income from chartering or leasing and was only incident to the other objects for which the craft were used.

At the census of 1889 there was no separation of the gross earnings, and therefore no comparison can be made of the amounts for each of the three sources of income shown in Table 37 for 1906. The increase in the total income for the different classes of craft and for all craft operating on the different waters of the country is shown in the comparative tables.

The income reported was the gross receipts for the entire census year. In cases where the owners were engaged in other business transactions entirely distinct from the operation of the vessels, such as the operation of railroads or mines, or manufacturing or mercantile pursuits, an estimate of the income derived from the vessels was given in reply to the Census inquiry. In some cases it was impossible to ascertain the exact amount of income from the different sources. Although the amount received for the passenger traffic was generally kept as a separate item in the account books of the shipping companies, in some instances, and especially for ferries, it was impracticable to obtain this amount as distinct from that received for the carriage of loaded vehicles or general express and freight matter, and in such cases estimates were

accepted. It was also impossible to obtain the income from craft operated as connecting links in railway systems. There are instances of duplication in the combination of the amounts reported as income from freight and as income from towing. Such duplication arises when the two classes of craft were operated under different ownership, the income from freight, which necessarily included the towing charge, being reported by the owner of the barges, and the income for towing by the owner of the tugboat. With these exceptions, the $294,854,532 given in Table 37 may be accepted as the gross earnings of all American craft during the year 1906; the totals for the three items "freight," "passenger," and "all other" do not, with the same degree of exactness, represent the income from each of these sources. They do, however, indicate that approximately 59.5 per cent of the gross income was derived from freight, 14.8 per cent from passengers, and 25.7 per cent from lightering, towing, chartering, etc. The proportion of the income that was derived from freight was largest on the Great Lakes and the St. Lawrence river and smallest for the vessels operating on the Mississippi river and its tributaries. The proportion derived from the passenger service was largest for the vessels on the Pacific coast and smallest for those on the Great Lakes and the St. Lawrence river.

TABLE 37.—GROSS INCOME—ALL VESSELS AND CRAFT, BY DIVISIONS AND OCCUPATIONS: 1906.

DIVISION AND OCCUPATION.	Total.	Freight.	Passenger.	All other.
Total	$294,854,532	$175,545,361	$43,645,365	$75,663,806
Freight and passenger	193,565,044	151,823,094	33,147,901	8,594,049
Towing vessels and unrigged craft	80,562,881	23,673,211	80,423	56,809,247
All other	20,726,607	49,056	10,417,041	10,260,510
Atlantic coast and Gulf of Mexico	159,759,924	83,890,161	25,643,332	50,226,431
Freight and passenger	92,096,988	68,185,461	18,208,365	5,703,162
Towing vessels and unrigged craft	54,727,996	15,697,425	46,254	38,984,317
All other	12,934,940	7,275	7,388,713	5,538,952
Pacific coast (including Alaska)	48,520,139	29,340,102	10,424,493	8,755,544
Freight and passenger	37,969,854	28,155,569	8,375,705	1,438,580
Towing vessels and unrigged craft	6,238,856	184,118	10,208	5,044,530
All other	4,311,429	415	2,038,580	2,272,434
Great Lakes and St. Lawrence river	65,274,702	52,076,533	4,866,904	8,331,265
Freight and passenger	56,850,553	51,150,376	4,408,880	1,291,297
Towing vessels and unrigged craft	7,067,422	889,511	1,168	6,176,743
All other	1,356,727	36,646	456,856	863,225
Mississippi river and its tributaries	17,342,638	7,450,860	2,281,243	7,609,926
Freight and passenger	5,934,629	4,038,002	1,766,581	130,046
Towing vessels and unrigged craft	9,342,145	3,412,867	15,780	5,913,498
All other	2,065,264	.....	498,882	1,566,382
Canals and other inland waters of New York state	2,781,604	2,198,920	264,397	318,287
Freight and passenger	387,489	108,648	259,037	19,804
Towing vessels and unrigged craft	2,388,965	2,090,272	1,350	297,343
All other	5,150	.....	4,010	1,140
All other inland waters	1,176,125	588,776	164,996	422,353
Freight and passenger	325,531	185,038	129,333	11,160
Towing vessels and unrigged craft	797,497	399,018	5,663	392,816
All other	53,097	4,720	30,000	18,377

The number, tonnage, and value of the vessels indicate the magnitude of the shipping interests, but the extent of their operations can only be determined by statistics of earnings, persons employed, and freight and passengers carried. Of these factors, it is believed that the totals for earnings, employees, and wages are the most complete. The increase in the gross income and the relation it bears to the tonnage and passengers carried is of course controlled to some extent by changes in freight and passenger rates. As shown in Table 1, the gross tonnage of the active vessels during 1906 showed an increase of 54.2 per cent over the tonnage for 1889, while the income increased 82 per cent. But on the other hand, the estimated commercial value of the craft increased 145.4 per cent, while in 1889 there was $78 of gross income for every $100 of value as compared with a gross income of $58 for every $100 of value in 1906. But as the value placed on the vessels and craft for Census purposes was not estimated with the care and consideration that should be given for values on which computations of this character are based, these percentages should be accepted only as an indication, and not as a true reflection of actual conditions. It is also probable that the totals for 1906 include the value of a larger number of yachts and of craft operated by railroads and others for which no income was returned than was reported at the census of 1889. If the figures for yachts and boats owned by local governments and those operated as connecting links in railway systems are excluded from the totals for 1906, there remain 31,772 vessels with a gross tonnage of 12,148,664 and valued at $450,521,010, or $37 per ton and $14,180 per vessel. The gross income from these

vessels for the year was $278,935,323, or $62 for each $100 of value. This tonnage, value, and income is almost wholly connected with the freight and passenger traffic, but it does not represent all the vessels and craft so employed, and because of the inherent defects existing in Census work of this character, the statistics for them should not be accepted as showing actual conditions.

EMPLOYEES AND WAGES.

The following inquiry and the accompanying instructions were used to collect the statistics for this feature of the census:

Employees: Account for the entire force employed on vessels or incident to their operation. The average number is the number required to operate the vessel. For employees on land give the average number employed during the entire year. If longshoremen or other persons are employed for short intervals, a careful computation should be made of the average number employed during the entire year, so as to avoid a duplication of the number when the reports for all craft, irrespective of ownership, are combined in the tabulations of the census. Give the total amount paid in wages and salaries during the year to all employees of each group. Wages should include board and lodging furnished as part compensation.

	AVERAGE NUMBER.	TOTAL AMOUNT PAID IN SALARIES OR WAGES DURING THE YEAR.
Employed on vessels or craft		$
EMPLOYED ON LAND, BUT INCIDENT TO THE OPERATION OF THE VESSELS OR CRAFT:		
Officers, managers, clerks, and all other salaried employees		$
All other employees		$
TOTAL		$

The number of persons reported as employed on vessels or craft was the number ordinarily required for their operation, including officers of all grades, seamen, stewards, cooks, laborers, etc. No distinction was made between the officers and the crew, because the managing owners contended that it was impracticable to separate the wages and salaries for the different classes. As it was the endeavor in all instances, where board was furnished the crew, to include, in the total wages, the amount of the food bill for the year, the wages should not be accepted as representing cash payments.

The land force reported included only the persons employed in connection with the operation of the vessels, in their loading and unloading, in the care and shipment of freight, in working about the warehouses, etc. The officers referred to in the inquiry are the general officers of corporations and do not include officers employed on the vessels.

TABLE 38.—EMPLOYEES, AND SALARIES AND WAGES, BY DIVISIONS: 1906.

DIVISION.	TOTAL.		ON VESSELS.		ON LAND.					
					Total.		Officers, managers, clerks, etc.		All other.	
	Number of employees.	Salaries and wages.	Number of employees.	Wages.	Average number of employees.	Salaries and wages.	Average number of employees.	Salaries.	Average number of employees.	Wages.
Total	188,348	$103,092,712	140,929	$71,636,521	47,419	$31,456,191	13,464	$12,276,420	33,955	$19,179,771
Atlantic coast and Gulf of Mexico	109,985	59,125,132	77,124	38,352,259	32,861	20,772,873	8,500	7,865,181	24,361	12,907,692
Pacific coast (including Alaska)	25,519	17,190,022	20,142	12,950,399	5,377	4,239,623	1,853	1,768,849	3,524	2,470,774
Great Lakes and St. Lawrence river	31,253	18,170,296	24,916	13,280,716	6,337	4,889,580	1,974	1,874,357	4,363	3,015,223
Mississippi river and its tributaries	17,473	7,063,776	15,016	5,692,117	2,457	1,371,659	1,011	686,536	1,446	685,123
Canals and other inland waters of New York state	2,710	1,020,715	2,472	920,260	238	100,455	92	54,695	146	45,760
All other inland waters	1,408	522,771	1,259	440,770	149	82,001	34	26,802	115	55,199

If a company was engaged exclusively in the shipping industry, and had a regular land force incident to the operation of vessels, this land force was reported in answer to the Census inquiry concerning the number employed on land; but in many instances the difficulties attending the collection of statistics concerning the number and wages of persons thus employed were somewhat similar to those referred to in connection with the valuation of land property. Such employees frequently work for master stevedores who load and unload vessels by contract. Where this practice prevailed or the stevedores were employed at

odd intervals, it was necessary to estimate the average number employed during the year and report as wages the amount paid for loading and unloading. As a rule, it is the large shipping companies which have the freight handled exclusively by their regular employees and the smaller operators who employ the contract stevedores. The shipments of many large vessels are, however, handled through arrangements with companies that make a specialty of loading and unloading freight.

The roustabouts and laborers employed in connection with craft operating on the Mississippi river and its tributaries are generally carried on the boat and included in the census as a part of the crew. Coal barges operating on these rivers are frequently loaded by the regular employees of the coal companies, and the delivery of the cargo does not include the unloading, which, as a rule, is done by the consignee. When this was the case the number of laborers was not included in the census. Machinery, however, is used extensively, especially in the shipment of ore, coal, and grain, and the number of persons employed on land in connection with vessels devoted to the carriage of such commodities is comparatively small. In some cases the regular employees of the shipping companies were engaged partly in branches of work not directly connected with the shipping, making it difficult to estimate the number that should be considered as employed exclusively in connection with water transportation.

There is thus little uniformity in the method of handling freight, and while the census includes practically all the land force, the statistics are not as complete as those for the persons employed on the vessels, and are presented, therefore, only in Table 38.

The number of persons employed on land was not reported at the census of 1889, but the number and wages of those reported as employed on the vessels at that census are given in the comparative tables. The inquiry at the census of 1889 called for the "number making up ordinary crew of vessel," and "total wages paid during the year," but there were no definite instructions in regard to the inclusion of board furnished as part compensation, and therefore a comparison of the aggregate wages in 1889 with the aggregate for 1906, which is supposed to include an allowance for board, indicates an increase that may be somewhat in excess of the actual increase.

The number of persons employed on vessels in 1906, when compared with the number so employed in 1889, shows an increase of 27,059. The number on steam vessels, including unrigged craft, increased by 45,178, while the number on sail vessels decreased by 18,119. The greatest number and the largest increase in employees is shown for vessels operating on the Atlantic coast and the Gulf of Mexico. The number for vessels in these waters increased 13,499, or 21.2 per cent, and formed 55.9 per cent of the total for all vessels in 1889 and 54.7 per cent of the total for 1906. The next greatest number, 24,916, was employed on the Great Lakes and the next, 20,142, on the Pacific coast.

There were 140,929 persons employed on vessels at the census of 1906, being an average of 3.7 for each vessel. This includes all classes of craft, on many of which none was employed. For the regular passenger and freight steamers the average for 1906 was 17.1 per vessel. The average for all vessels of this class can not be obtained for 1889, but the average for such vessels operating on the Atlantic coast and the Gulf of Mexico was 19.5 and for those on the Pacific coast 16.5 as compared with 16.5 and 19.8 in 1906.

The wages reported are the total amount paid during the year, but there is no indication of the term of employment. A vessel requires as large a crew for a cruise of one or two months as it does for one of a year, but the combination of the amounts paid for various periods of employment should not be used as a basis to compute the annual wages. The statistics include wages paid employees on dredges, pile drivers, and similar craft, many of which are operated by harbor commissioners or other Government officials. The wages on these craft are, in many instances, much higher than on other vessels. The statistics, being compiled uniformly for all classes of vessels, can be used to show the contribution of each class to the aggregate for the United States. Of the $103,092,712 reported for salaries and wages, $71,636,521, or 69.5 per cent, were for employees on vessels and $31,456,191, or 30.5 per cent, for those on land. Of the total for employees on vessels, $50,504,508, or 70.5 per cent, went to those on steam vessels; $10,371,047, or 14.5 per cent, to those on sail vessels; and $10,760,966, or 15 per cent, to those on unrigged craft. Unrigged craft are sometimes operated by the crew of the steamboat and in such cases the wages are credited to the steam vessels. The $59,125,132 reported as salaries and wages on the Atlantic coast and the Gulf of Mexico forms 57.4 per cent of the total. The next largest amount, $18,170,296, or 17.6 per cent, is reported for the Great Lakes. The Pacific coast ranks third in this respect, the total being $17,190,022, or 16.7 per cent.

The census contains no information in regard to the number of the different classes of seamen or to the rates of wages paid, because such information is contained in the annual reports of the Bureau of Navigation, Department of Commerce and Labor. The statistics which are compiled by the United States shipping commissioners show the average rates of wages paid to seamen of the various grades on steam and sailing vessels in the different branches of the foreign and coasting trade. These figures indicate a wide range of wages in the American merchant marine, as is shown by the following tabular statement prepared from that source, which presents data for the year ending June 30, 1906. It should be explained that the statement does not include the wages paid on

the Great Lakes but only on the Atlantic coast and Gulf of Mexico and the Pacific coast, and that the extreme rates given must not be accepted as the lowest and highest wages paid in individual cases; they are simply port averages. The rates represent the cash earnings of the crew and do not include board furnished as part compensation.

Range of rates of monthly wages.

GRADE.	On steam vessels.	On sail vessels.
Able seamen	$15 to $45.42	$15 to $40
Boatswains	25 to 50	20 to 50
Carpenters	30 to 60	25 to 53.57
First mates	40 to 125	25 to 61.50
Second mates	30 to 76.67	18 to 50.12
Firemen	16 to 50	.....
Trimmers	14 to 40.53	.....
First engineers	70 to 180	.....
Second engineers	50 to 126.50	.....

FREIGHT.

The annual reports and monthly summaries of commerce and finance published by the Bureau of Statistics contain information concerning the quantity of freight carried on the Great Lakes and other waters of the United States; the reports of the chief of engineers of the United States Army and of the boards of trade and chambers of commerce of various cities also contain statistics on this important feature of water commerce. As the statistics contained in these various reports do not cover the operations of all vessels, being taken for different periods and not compiled uniformly, they could not be used by the Census Office to show the total quantity of freight moved by all American craft during the census year. Those compiled by the Bureau of Statistics for the freight carried on the Great Lakes could, however, be used by the Census, and in order to make use of them and thus avoid duplication of work the Census schedule was made to correspond as nearly as possible with the schedule used by the Bureau of Statistics.

The Census inquiry was designed to obtain for each vessel a report of the quantity, in net tons, of all freight carried during the year 1906, classified by ports of shipment and receipt. The quantities for the following commodities were reported separately:

Canned goods.
Cement, brick, and lime.
Coal.
Cotton.
Flour.
Fruits and vegetables.
Grain.
Ice.
Iron ore.
Lumber.
Naval stores.
Petroleum and other oils.
Phosphate and fertilizer.
Pig iron and steel rails.
Stone, sand, etc.
Tobacco.
Miscellaneous merchandise.

The collection of statistics of freight was perhaps attended by more difficulties than any other feature of the census. Many of the managing owners kept no record of the quantities of the different commodities carried and could therefore give only estimates in reply to the Census inquiry. The absence of all records was most frequent in the case of vessels which operate on rivers and bays, and ship and discharge miscellaneous freight at numerous landings. Frequently package freight of this character is not weighed, and if the weight is taken no record of it is preserved. To meet cases where no record or estimate of the quantity of the different commodities could be obtained the schedule called for an "estimated total quantity of freight of all kinds shipped from ports during the year (tons of 2,000 pounds)," and a corresponding inquiry was made concerning the deliveries. It is believed that the managing owners or masters of vessels gave reasonably accurate estimates of the total tonnage carried during the year, even when unable to approximate the quantities of the different classes of merchandise.

Estimates and uncertainties of this character necessarily entered into the statistics of freight for the census of 1889, and a comparison of the totals for that census with those for 1906 should not be accepted as showing the actual increase. But such a comparison is of some value as an indication of general conditions.

TABLE 39.—*Freight transportation, including harbor traffic, by divisions: 1906 and 1889.*

DIVISION.	Census.	Freight carried (net tons).	Per cent of total.
Total	1906	265,545,804	100.0
	1889	129,851,658	100.0
Atlantic coast and Gulf of Mexico	1906	140,512,043	52.9
	1889	52,712,124	40.6
Pacific coast (including Alaska)	1906	17,622,816	6.6
	1889	11,249,927	8.7
Great Lakes and St. Lawrence river	1906	[1]75,609,649	28.5
	1889	25,206,974	19.5
Mississippi river and its tributaries	1906	27,856,641	10.5
	1889	29,401,409	22.6
All other inland waters	1906	3,944,655	1.5
	1889	11,221,224	8.6

[1] From the report of the Bureau of Statistics on the internal commerce of the United States and includes 2,003,453 net tons of bunker coal.

As this report relates only to freight carried on American vessels it does not represent the total traffic of American ports. Attention is called also to the following:

The 265,545,804 net tons of freight reported for 1906 include 88,026,046 tons, which is the estimated quantity carried on lighters and barges in and around harbors for all waters except the Great Lakes. This was necessary in order to obtain data as nearly as possible comparable with 1889. The statistics for the Great Lakes were compiled by the Bureau of Statistics, which does not take cognizance of harbor traffic. This class of freight does not appear to have been reported for the Great Lakes at the census of 1889, but it is presumed that at that census it was included in the statistics for all the other waters, though probably not as fully reported then as in 1906.

The figures for the Atlantic coast and the Gulf of Mexico include practically the same class of traffic at both censuses, with the exception of the lighterage or harbor

work reported for some ferryboats in 1906; this class of freight was omitted from the statistics for the division at the census of 1889 and was not fully reported for 1906.

The totals for the Pacific coast for 1889 include the freight carried on fishing vessels—that is, the provisions and supplies to the fishing grounds, and the catch of fish to the market or cannery. All fishing vessels and freight carried on them were excluded from the census of 1906. The freight represented by logs towed in rafts was also partially reported in 1889 but omitted entirely in 1906.

Freight carried between American and Canadian ports on the Great Lakes was included in 1889 but omitted in 1906.

The tonnage of freight transported in vessels of the United States in 1906 is more than double that reported for 1889, while the proportionate increases for the Atlantic coast and the Great Lakes are considerably larger. In this respect the Mississippi river system shows a small decrease, and "all other inland waters," which is made up almost wholly of the canals of the country, shows a large decrease.

TABLE 40.—FREIGHT SHIPPED, BY COMMODITIES: 1906.

COMMODITY.	Total.	Atlantic coast and Gulf of Mexico.	Pacific coast (including Alaska).	Great Lakes and St. Lawrence river.[1]	Mississippi river and its tributaries.	All other inland waters.
Canned goods.....net tons..	402,781	193,602	144,372	[2]	63,697	1,110
Cement, brick, and lime.....net tons..	5,165,051	4,738,177	251,677	[2]	95,443	79,754
Coal.....net tons..	[3]49,109,605	19,149,753	451,781	[3]17,575,467	11,033,011	899,593
Cotton.....net tons..	968,337	793,992	25,957	[2]	146,975	1,413
Flour.....net tons..	1,876,855	104,362	350,918	1,334,979	81,900	4,696
Fruits and vegetables.....net tons..	1,100,113	796,329	232,214	[2]	55,703	15,867
Grain.....net tons..	5,792,012	530,843	691,779	3,689,329	380,721	499,340
Ice.....net tons..	2,041,939	1,951,188	2,493	[2]	17,229	71,029
Iron ore.....net tons..	41,524,102	18,465	37	41,297,209	171,779	36,612
Lumber.....M ft..	7,111,144	2,793,742	1,981,930	1,883,175	225,545	226,752
Naval stores.....net tons..	392,027	373,261	10,267	[2]	770	7,729
Petroleum and other oils.....bbls..	30,029,515	16,840,716	10,929,939	[2]	2,256,230	2,630
Phosphate and fertilizer.....net tons..	1,277,215	1,187,883	37,144	[2]	44,413	7,775
Pig iron and steel rails.....net tons..	1,165,825	664,758	19,861	414,110	55,346	11,750
Stone, sand, etc.....net tons..	14,659,972	7,391,354	2,340,008	[1]	4,004,259	924,351
Tobacco.....net tons..	281,892	165,776	2,115	[2]	11,000	1
Miscellaneous merchandise.....net tons..	32,592,973	18,580,196	3,536,392	[4]7,305,390	2,385,418	785,577

[1] From the report of the Bureau of Statistics on the internal commerce of the United States.
[2] Included in "miscellaneous merchandise."
[3] Includes 2,003,453 net tons of bunker coal.
[4] Includes canned goods, cement, brick, and lime, cotton, fruits and vegetables, ice, naval stores, petroleum and other oils, phosphate and fertilizer, stone, sand, etc., and tobacco.

Exact comparisons of the data shown in Table 40 can not be made with similar data for 1889, as it is impossible to separate the harbor traffic from the figures for the latter census. The statistics represent "shipments" of freight, in American vessels only, whether from domestic or from foreign ports. A similar table of "receipts" would vary in the aggregate for the United States but slightly from this, but owing to shipments from one division to another the totals for some of the divisions for certain commodities might differ considerably.

The statistics for the Great Lakes were obtained from the report of the Bureau of Statistics on the internal commerce of the United States. This report does not classify separately certain commodities which are classified separately on the Census schedules. Therefore the total for such commodities for the United States does not include the small amounts possibly shipped on the Great Lakes and relate to domestic traffic only. There are other limitations described in the separate section on the Great Lakes.

The statistics of freight movement on the inland waters as compiled by the Census do not agree with those contained in the reports of the chief of engineers of the United States Army, principally because the Census reports are for the calendar year, while the reports of the chief of engineers cover the fiscal year ending June 30, and also because the Census reports include neither the operation of boats under 5 tons nor the movement of rafted or floated material, both of which are included in the reports of the War Department.

Judged by the tonnage moved, coal is the most important single item of merchandise in the water commerce of the United States. The movement is composed principally of shipments of hard coal from the railroad terminals on the coast of New Jersey and of soft coal from Atlantic coast ports farther south. Immense quantities of anthracite and bituminous coal are also carried westward on the Great Lakes from Lake Erie ports. The Mississippi river coal traffic is composed almost wholly of the shipment of soft coal on barges from the Pittsburg region to Cincinnati, Louisville, St. Louis, New Orleans, and other cities on the Mississippi river and its tributaries. All available statistics show that the movement of coal has increased remarkably since 1889 in all divisions except the Pacific coast. The coal taken from the New Jersey railroad terminals for consumption in and about Greater New York is treated as a part of the local traffic of that harbor, as it was found impossible to obtain accurate statistics of this movement. According to the best information obtainable, however, it almost equals the entire interport traffic in coal on the Atlantic coast and Gulf of Mexico. Bunker coal, loaded for use on the vessels, is not included in the Census reports.

Next to coal the greatest tonnage is shown for iron ore, although the transportation of this commodity on

the waters of the United States other than the Great Lakes is insignificant. The movement was greatest from ports on Lake Superior and on Lake Michigan, and was perhaps greater than that of any single commodity in an equally small field in any other part of the world. Iron ore shipments in 1889 amounted to only 8,279,032 tons, while in 1906 they amounted to 41,524,102 tons, an increase of over 400 per cent.

"Miscellaneous merchandise" embraces a multiplicity of articles, but disregarding these, building materials—stone, sand, brick, cement, and lime—form the third most important class of freight. Vast quantities of these materials are transported by water. The movement, moreover, is not localized, but reported for all waters where large cities create a demand for such materials.

The quantity of lumber or timber shipped by water in 1889 was 24,935,636 tons, or approximately 12,000,000 thousand feet, and in 1906 it was only 7,111,144 thousand feet, a very large decrease. Except for "all other inland waters" a decrease in lumber transportation is noted on all the waters of the United States. With the gradual exhaustion of the forests near the water courses, the lumber industry has been pushed so far into the interior that water transportation of the product is impracticable. The figures for 1889 included to some extent the movement of timber in rafts, which was omitted in 1906, because it was impossible to secure correct information concerning the quantity moved in this manner. This change in methods accounts for the apparent decrease in the quantity of lumber moved on the Pacific coast, as upon the waters of this division large quantities of timber are still shipped in the form of rafts. If the statistics of this movement in 1906 were fully reported, it would doubtless show a large increase over 1889.

The largest quantities of grain and flour are shown for the Great Lakes, the movement being eastward from Duluth, Superior, Chicago, and Milwaukee. Much of the grain reaches the seaboard for export by way of the Erie canal, and forms one of the most important items in the foreign trade of the country. The principal ports of shipment for exported breadstuffs are Boston, New York, Philadelphia, Baltimore, and Newport News on the Atlantic coast; New Orleans and Galveston on the Gulf; and San Francisco, Portland, and the Puget Sound ports on the Pacific.

The transportation of petroleum by water consists largely of exports of crude and refined oil from the customs districts of New York, Philadelphia, Wilmington, Del., Galveston, and San Francisco, and the coastwise movement of crude petroleum from the Texas oil territory to eastern ports for refining. The tank steamers employed in this commerce present probably the most economical method of water transportation.

The transportation of ice is confined largely to the Atlantic coast, and consists chiefly in the shipment of the natural product from Maine and other New England states to southern cities, and from points on the Hudson river to New York city. The census of 1889 reports 2,692,873 tons of ice shipped on the Atlantic coast, while only 1,951,188 tons are reported for 1906. The decrease is due probably to the increase in the manufacture of ice, for which the gross value of products increased from $4,900,983 in 1890 to $23,790,045 in 1904.[1]

A large proportion of the phosphate and fertilizer produced in this country is transported by water, either in coastwise commerce or as exports. Much of the crude rock is either exported in that form or is transported from Florida or South Carolina to cities farther north for manufacture into the finished fertilizer. In no division except the Atlantic coast and Gulf of Mexico are phosphate and fertilizer carried by water to any considerable extent.

TABLE 41.—*Freight carried and income received for freight, exclusive of harbor work, by divisions: 1906.*

DIVISION.	Freight (net tons).	Per cent of total.	Income.	Per cent of total.
Total	177,519,758	100.0	$175,545,361	100.0
Atlantic coast and Gulf of Mexico	65,360,958	36.8	83,890,161	47.8
Pacific coast (including Alaska)	13,301,293	7.5	29,340,102	16.7
Great Lakes and St. Lawrence river	[1]75,609,649	42.6	52,076,533	29.7
Mississippi river and its tributaries	19,531,093	11.0	7,450,869	4.2
All other inland waters	3,716,765	2.1	2,787,696	1.6

[1] From the report of the Bureau of Statistics on the internal commerce of the United States and includes 2,003,453 net tons of bunker coal.

The true relation of freight and income can not be determined without complete information in regard to the distances the freight was carried, the character of the commodities, the kind of vessels, and many other considerations that have an important bearing upon the subject. The Census schedule called for the distance sailed by each vessel during the year, but such a large number of shipowners declared their inability to furnish the information, that the inquiry was abandoned. The absence of such information renders it impossible to make any comparison of the tonnage and gross income from freight. The figures show, however, that the proportions in which the divisions contribute to the total income are very different from the proportions in which they contribute to the total quantity of freight. The Pacific coast contributes 7.5 per cent of the total quantity of freight as contrasted with 16.7 per cent of the total income, a fact which indicates that the average haul is longer and the work generally more costly than in other sections of the country. To a less degree the same conditions are apparent for the Atlantic coast and the Gulf of Mexico. On the other hand, the proportions for the Great Lakes and the Mississippi river are reversed, the amount of freight forming a much larger

[1] Census of Manufactures, 1905, Bulletin 83.

per cent of the total than the income. In both these divisions the bulky commodities—iron ore, grain, and coal on the Great Lakes, and coal on the Mississippi river—form overwhelming proportions of the total freight carried, and the charges in proportion to the tonnage and distance are very low. The conditions surrounding water transportation in different parts of the country are matters of common knowledge and confirm the general accuracy of the statistics.

Table 41 embraces all freight transported from one port to another, but does not include harbor work, lightering, etc. While the statistics reported for vessels engaged in harbor traffic are included in the general tables, the different varieties of merchandise transported by such craft between different points in the harbor were not reported. Shipmasters were not required to make a report of the various commodities thus transported, but did report the total quantity carried during the year, which is presented in Table 42.

TABLE 42.—*Number of tons carried by vessels engaged in harbor work, by divisions: 1906.*[1]

DIVISION.	Tons.
Total	88,026,046
Atlantic coast and Gulf of Mexico	75,151,085
Pacific coast (including Alaska)	4,321,523
Mississippi river and its tributaries	8,325,548
All other inland waters	227,890

[1] This table does not include harbor freight on the Great Lakes.

The fact that harbor freight on the Great Lakes is not included should always be given due weight in accepting the statistics for this feature of water transportation. Harbor traffic about Chicago, Cleveland, Buffalo, Milwaukee, and other large cities on the Great Lakes is undoubtedly of immense proportions, and if the returns of such operations had been obtained, the total amount of harbor freight would be much larger than is shown in Table 42.

Nearly all the harbor work represented by the 88,026,046 tons of freight moved was reported for ports on the Atlantic coast and Gulf of Mexico. New York, with its long water front provided with docks and piers and navigable at almost all points for the largest vessels, and with its immense population, must necessarily require a large number of vessels to meet the demands for service of this character. It is safe to state that a very large proportion of the whole is represented by operations in that harbor. The single item of coal consumed in New York, particularly anthracite, practically all of which is transported from the railroad terminals in New Jersey, amounts to several millions of tons annually. All supplies for the city except those produced within its own borders, those delivered by the railroads entering at the north, and the limited amount coming from the outlying counties of Long Island, must be delivered by water.

A more detailed discussion of freight is presented in the separate sections of this report, which give details for the several divisions and for the shipments and receipts of freight to and from foreign countries.

The value of the foreign trade of the United States is given for a series of years in Table 43, which shows the proportion in which this value was divided between American and foreign vessels.

Table 44 shows the tonnage of the sailing and steam vessels of the United States merchant marine, exclusive of fishing vessels, classified in accordance with the character of trade in which the tonnage was employed, whether coastwise or foreign.

TABLE 43.—*Value of the foreign trade of the United States in American and foreign vessels: 1889 to 1906.*[1]

YEAR ENDING JUNE 30—	Total.	In American vessels.	In foreign vessels.	Per cent in American vessels.
1889	$1,420,868,649	$203,805,108	$1,217,063,541	14.3
1890	1,573,567,830	202,451,086	1,371,116,744	12.9
1891	1,656,540,812	206,459,725	1,450,081,087	12.5
1892	1,784,733,386	220,173,735	1,564,559,651	12.3
1893	1,626,082,075	197,765,507	1,428,316,568	12.2
1894	1,468,290,672	195,268,216	1,273,022,456	13.3
1895	1,456,403,388	170,507,196	1,285,896,192	11.7
1896	1,565,665,408	187,691,887	1,377,973,521	12.0
1897	1,714,829,043	189,075,277	1,525,753,766	11.0
1898	1,743,820,496	161,328,017	1,582,492,479	9.3
1899	1,806,876,063	160,612,206	1,646,263,857	8.9
1900	2,089,528,616	195,084,192	1,894,444,424	9.3
1901	2,151,935,411	177,398,615	1,974,536,796	8.2
1902	2,104,849,301	185,819,987	1,919,029,314	8.8
1903	2,240,801,420	214,695,032	2,026,106,388	9.6
1904	2,230,938,633	229,735 119	2,001,203,514	10.3
1905	2,393,809,408	290,607,946	2,103,201,462	12.1
1906	2,690,014,559	322,347,205	2,367,667,354	12.0

[1] Statistical Abstract of the United States, 1906, page 620.

TABLE 44.—*Tonnage of the sail and steam vessels of the merchant marine of the United States employed in the foreign and coastwise trade, not including fishing vessels: 1889 to 1906.*[1]

YEAR ENDING JUNE 30—	Total (tons).	Foreign (tons).	Coastwise (tons).
1889	4,211,035	999,619	3,211,416
1890	4,337,497	928,062	3,409,435
1891	4,598,595	988,719	3,609,876
1892	4,678,397	977,624	3,700,773
1893	4,737,892	883,199	3,854,693
1894	4,595,974	899,698	3,696,276
1895	4,551,061	822,347	3,728,714
1896	4,620,129	829,833	3,790,296
1897	4,689,696	792,870	3,896,826
1898	4,685,915	726,213	3,959,702
1899	4,802,542	837,229	3,965,313
1900	5,103,311	816,795	4,286,516
1901	5,462,240	879,595	4,582,645
1902	5,731,949	873,235	4,858,714
1903	6,020,301	879,264	5,141,037
1904	6,223,792	888,628	5,335,164
1905	6,385,438	943,750	5,441,688
1906	6,602,510	928,466	5,674,044

[1] Statistical Abstract of the United States, 1906, page 604.

PASSENGERS.

While the majority of the vessels included in the class of "freight and passenger" make a specialty of freight traffic, a considerable proportion of the gross earnings for the entire fleet is derived from the passenger service. During 1906 the income from this source amounted to $43,645,365, or 14.8 per cent of the annual gross earnings for all craft.

TABLE 45.—*Number of passengers, by divisions: 1906 and 1889.*

DIVISION.	Census.	NUMBER OF PASSENGERS. Total.	Ferry.	All other.
Total	1906	366,825,663	330,737,639	36,088,024
	1889	108,992,438	182,033,991	16,958,447
Per cent of increase		84.3	81.7	112.8
Atlantic coast and Gulf of Mexico	1906	292,555,416	272,596,670	19,958,746
	1889	170,225,458	158,644,012	11,581,446
Per cent of increase		71.9	71.8	72.3
Pacific coast (including Alaska)	1906	44,189,971	39,532,354	4,657,617
	1889	15,672,093	14,291,859	1,380,234
Per cent of increase		182.0	176.6	237.5
Great Lakes and St. Lawrence river	1906	14,080,146	8,264,482	5,815,664
	1889	2,235,993	623,474	1,612,519
Per cent of increase		529.7	1,225.6	260.7
Mississippi river and its tributaries	1906	14,122,241	10,022,612	4,099,629
	1889	10,858,894	8,474,646	2,384,248
Per cent of increase		30.1	18.3	71.9
All other inland waters	1906	1,877,889	321,521	1,556,368
	1889	(1)	(1)	(1)

[1] Not reported.

The 330,737,639 passengers carried by ferryboats during 1906 formed over nine-tenths of the total number carried by all classes of vessels, and the percentage of such passengers was somewhat less than in 1889. The greatest actual increase, 148,703,648, is shown for this class of passengers, but the largest percentage of increase, 112.8, occurred in the other class of passengers, which includes excursionists.

It would be of considerable interest if it were possible to ascertain from the returns the number of passengers that traveled by water for pleasure as distinguished from those traveling for business or other purposes, but such information could only be obtained from the individual passenger, and it would be impossible to secure the statistics in connection with a general census. It seems safe to assert, however, that, exclusive of ferry passengers, much the larger proportion of passengers is composed of summer excursionists taking short trips solely for pleasure.

Practically all the passengers reported were carried on steam passenger and ferry boats, but some were reported by vessels that were not engaged regularly in the passenger and freight business, such as tugboats, sailing vessels, and unrigged craft of various kinds. These passengers, altogether, numbered 785,447, of which 24,915 were carried on sailing vessels, and 760,532 on unrigged craft, towboats, etc.

The Atlantic coast and Gulf of Mexico is by far the most important district in the number of passengers, due in a large degree to the enormous number of ferry passengers carried about New York city and to the coastwise passenger traffic from this port. Large numbers of ferry passengers were also reported for Philadelphia and Boston. Passenger traffic on the Pacific coast, which is second in importance, centers in San Francisco bay, and is made up largely of ferry passengers in that neighborhood and of regular passengers to Portland, Seattle, and other coast cities.

In commenting on the statistics for passengers carried on the Great Lakes the report for 1889 states that "the figures of passenger traffic are interesting as far as they go, but it must be confessed that the returns were not made with that scrupulous care which characterized the schedule reports of traffic and equipment." It is evident from this that the statistics for that division are defective; presumably the full number was not reported, and the large percentage of increase, especially in ferry passengers, should not be accepted as representing the actual increase. The passenger service on these waters has, however, increased rapidly, probably in a greater ratio than for any other division.

In the annual reports of the United States Steamboat Inspection Service the number of passengers carried is reported for the various inspection districts, and the number reported by that office for the United States by all the vessels subject to its supervision in 1906 is 357,794,491. The different methods followed in collecting the statistics, and the fact that they were collected at different times, account in part for the discrepancy of about 9,000,000 between these totals. But the statistics for many vessels are necessarily estimates, and it is seldom that the same total can be obtained when compiled from different sources of information or at different times.

The tabulation of the census figures was not made with the idea of localizing the statistics of passenger traffic, but in a measure this is done in the reports of the Steamboat Inspection Service. Table 46, prepared from that source, presents the figures reported by the local inspectors for several of the more important inspection districts for 1906.

TABLE 46.—*Passengers reported for the principal districts of the United States Steamboat Inspection Service: 1906.*[1]

LOCAL INSPECTION DISTRICT.	Number of passengers.
Total	357,794,491
New York, N. Y	213,575,838
San Francisco, Cal	35,482,941
Philadelphia, Pa	32,228,294
Boston, Mass	17,665,329
Detroit, Mich	7,403,154
Norfolk, Va	5,964,799
New Orleans, La	4,030,718
Albany, N. Y	3,840,186
Baltimore, Md	3,702,873
Seattle, Wash	3,170,452
St. Louis, Mo	2,900,233
Providence, R. I	2,785,293
Portland, Me	2,372,900
Portland, Oreg	2,318,850
Chicago, Ill	1,818,194
Cincinnati, Ohio	1,649,038
Toledo, Ohio	1,565,056
New London, Conn	1,335,745
Point Pleasant, W. Va	1,297,152
Dubuque, Iowa	1,053,115
Duluth, Minn	1,051,074
All other	10,583,257

[1] Annual report of the Steamboat Inspector-General.

IDLE VESSELS.

Craft that were not in operation during any portion of the year 1906 were considered as idle. Many of these craft are carried on the records of the Bureau of

Navigation of the Department of Commerce and Labor, but in this report the statistics for them are not included with those for the active craft. As the collection of data for idle craft was merely incident to the census, the enumeration of them was not as thorough as that of the active craft.

TABLE 47.—*Idle vessels: 1906.*

DIVISION AND CLASS.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1,762	179,326	$10,511,363
Steam	830	99,897	8,735,852
Sail	565	20,014	936,890
Unrigged	367	59,415	838,621
Atlantic coast and Gulf of Mexico	1,074	87,254	6,895,147
Steam	450	49,131	5,801,871
Sail	475	11,971	780,405
Unrigged	149	26,152	312,871
Pacific coast (including Alaska)	252	28,229	2,062,793
Steam	145	21,994	1,851,731
Sail	43	1,391	69,935
Unrigged	64	4,844	141,127
Great Lakes and St. Lawrence river	197	41,437	1,049,969
Steam	117	23,639	758,930
Sail	46	6,642	85,550
Unrigged	34	11,156	205,489
Mississippi river and its tributaries	171	15,038	310,685
Steam	100	4,482	256,220
Sail			
Unrigged	71	10,556	54,465
Canals and other inland waters of New York state	32	5,121	128,869
Steam	9	330	28,600
Sail	1	10	1,000
Unrigged	22	4,781	99,269
All other inland waters	36	2,247	63,900
Steam	9	321	38,500
Sail			
Unrigged	27	1,926	25,400

The majority of the 1,762 idle craft enumerated were small and comparatively unimportant. The average tonnage per vessel for the entire number was 102 as compared with an average of 345 tons for the active vessels.

Income or earnings can not be considered a factor in estimating the value of idle craft, and the amount reported is necessarily an arbitrary value fixed by the owner. The average value per vessel was $5,966 as compared with $13,611 for active craft.

The comparatively large number of steam vessels reported as idle is due partly to the fact that they are of greater value than the sail or the unrigged vessels, not easily convertible into vessels of another character, and because of machinery and furnishings more liable to deterioration, hence when they go out of commission or suspend operations they are preserved so that they can be put into use again later. Steam vessels, too, were more easily located by the Census agents than were those of the other classes, which are more often laid up in waters that would not be visited for the purpose of finding active vessels, and therefore it is possible that more of them were missed in the canvass.

Another reason why the number of sail and unrigged craft reported as idle was not so great as for steam vessels, is the fact that these smaller craft of the first two classes, which have been idle for an entire year, are more liable to be considered as abandoned and therefore not included in the statistics.

PORTO RICO AND THE HAWAIIAN ISLANDS.

The statistics for the local shipping of these islands are not included in the totals for the United States, but are shown separately in Table 48.

TABLE 48.—VESSELS OPERATING LOCALLY AT PORTO RICO AND THE HAWAIIAN ISLANDS: 1906.

	PORTO RICO.				HAWAIIAN ISLANDS.			
	Total.	Steam.	Sail.	Unrigged.	Total.	Steam.	Sail.	Unrigged.
Number of vessels	205	4	43	158	52	26	10	16
Gross tonnage	5,566	94	905	4,567	10,682	8,828	592	1,262
Value of vessels	$180,519	$29,200	$43,175	$108,144	$1,204,100	$1,142,250	$16,900	$44,950
Gross income	$227,031	$7,600	$42,258	$177,173	$1,488,090	$1,424,702	$12,042	$51,346
Number of employees	603	16	132	455	767	685	43	39
Wages	$121,533	$5,381	$24,861	$91,291	$428,679	$401,215	$9,044	$18,420
Number of passengers carried	2,400	.....	2,400	.....	75,614	75,614	.....	.....
Freight carried (net tons)	24,120	.....	24,120	.....	380,811	373,755	7,056	.....

As the statistics for the craft covered by Table 48 were collected entirely by correspondence, the canvass was not as thorough as it was for other districts. In addition to the probability that some active craft failed to make reports, it is apparent that the statistics of income, employees, wages, passengers, and freight for the craft that did report are not complete.

CONDITIONS BETWEEN CENSUS YEARS.

All comparisons of data in this report relate to the conditions during two periods of twelve months each which are sixteen years apart. While these comparisons show that as a whole the American tonnage was very much larger in 1906 than it was in 1889, it does not follow that a constant increase was maintained from year to year in the number and tonnage of vessels. The most accurate information concerning the annual increase or decrease is contained in the reports of the Bureau of Navigation, Department of Commerce and Labor, which statistics for the registered, enrolled, and licensed vessels are reproduced in Table 49.

TABLE 49.—NUMBER AND GROSS TONNAGE OF REGISTERED, ENROLLED, AND LICENSED SAIL AND STEAM VESSELS CONSTITUTING THE TOTAL MERCHANT MARINE OF THE UNITED STATES, INCLUDING FISHING VESSELS: 1889 TO 1906.[1]

YEAR.	TOTAL MERCHANT MARINE.							ENROLLED AND LICENSED VESSELS, UNDER 20 TONS.						REGISTERED VESSELS.					
	Total.			Sail.[2]		Steam.		Total.			Sail.[2]		Steam.	Total.			Sail.[3]		Steam.	
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	25,006	6,674,969	3.4	15,506	2,699,682	9,500	3,975,287	23,565	5,735,483	4.2	14,471	2,351,481	9,094	3,384,002	1,441	939,486	[4] 1.6	1,035	348,201	406	591,285
1905	24,681	6,456,543	2.6	15,784	2,715,049	8,897	3,741,494	23,309	5,502,030	2.0	14,792	2,361,716	8,517	3,140,314	1,372	954,513	6.2	992	353,333	380	601,180
1904	24,558	6,291,535	3.4	16,095	2,696,117	8,463	3,595,418	23,354	5,392,767	3.7	15,239	2,351,505	8,115	3,041,262	1,204	898,768	1.1	856	344,612	348	554,156
1903	24,425	6,087,345	5.0	16,371	2,679,257	8,054	3,408,088	23,255	5,198,569	5.8	15,558	2,317,891	7,697	2,880,678	1,170	888,776	0.7	813	361,366	357	527,410
1902	24,273	5,797,902	5.0	16,546	2,621,028	7,727	3,176,874	23,047	4,915,347	6.0	15,661	2,197,298	7,386	2,718,049	1,226	882,555	[4] 0.7	885	423,730	341	458,825
1901	24,057	5,524,218	7.0	16,643	2,603,265	7,414	2,920,953	22,730	4,635,089	6.8	15,671	2,143,858	7,059	2,491,231	1,327	889,129	7.6	972	459,407	355	429,722
1900	23,333	5,164,839	6.2	16,280	2,507,042	7,053	2,657,797	22,003	4,338,145	8.0	15,288	2,021,690	6,715	2,316,455	1,330	826,694	[4] 2.5	992	485,352	338	341,342
1899	22,728	4,864,238	2.4	15,891	2,388,227	6,837	2,476,011	21,397	4,015,992	0.1	14,927	1,900,011	6,470	2,115,981	1,331	848,246	15.0	964	488,216	367	360,030
1898	22,705	4,749,738	[4] 0.4	15,993	2,377,815	6,712	2,371,923	21,569	4,012,029	1.2	15,169	1,934,170	6,400	2,077,859	1,136	737,709	[4] 8.4	824	443,645	312	294,064
1897	22,633	4,769,020	1.4	16,034	2,410,462	6,599	2,358,558	21,403	3,963,436	2.7	15,051	1,863,352	6,352	2,100,084	1,230	805,584	[4] 4.7	983	547,110	247	258,474
1896	22,908	4,703,880	1.5	16,313	2,396,672	6,595	2,307,208	21,651	3,858,926	1.6	15,300	1,816,600	6,351	2,042,326	1,257	844,954	0.8	1,013	580,072	244	264,882
1895	23,240	4,635,960	[4] 1.0	16,686	2,423,159	6,554	2,212,801	21,980	3,797,773	0.8	15,665	1,837,017	6,315	1,960,756	1,260	838,187	[4] 8.5	1,021	586,142	239	252,045
1894	23,586	4,684,029	[4] 2.9	17,060	2,494,599	6,526	2,189,430	22,236	3,767,849	[4] 4.0	15,956	1,844,510	6,280	1,923,339	1,350	916,180	1.8	1,104	650,089	246	266,091
1893	24,512	4,825,071	1.3	17,951	2,641,799	6,561	2,183,272	23,169	3,925,268	4.1	16,857	2,003,099	6,312	1,922,169	1,343	899,803	[4] 9.5	1,094	638,700	249	261,103
1892	24,383	4,764,921	1.7	17,991	2,690,504	6,392	2,074,417	22,851	3,770,246	2.5	16,713	1,924,728	6,138	1,845,518	1,532	994,675	[4] 1.1	1,278	765,776	254	228,899
1891	23,899	4,684,759	5.9	17,683	2,668,495	6,216	2,016,264	22,312	3,678,809	5.8	16,367	1,902,540	5,945	1,776,269	1,587	1,005,950	6.3	1,316	765,955	271	239,995
1890	23,467	4,424,497	2.7	17,502	2,565,409	5,965	1,859,088	21,940	3,477,802	5.8	16,208	1,816,344	5,732	1,661,458	1,527	946,695	[4] 7.3	1,294	749,065	233	197,630
1889	23,623	4,307,475	.....	17,699	2,541,924	5,924	1,765,551	21,942	3,285,880	.....	16,237	1,714,801	5,705	1,571,079	1,681	1,021,595	.....	1,462	827,124	219	194,471

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.
[2] Including canal boats and barges.
[3] Including barges.
[4] Decrease.

The figures for twelve of the years shown in Table 49 represent an increase over the preceding year in the number of vessels constituting the merchant marine, while the figures for five of the years represent a decrease. The largest percentages of increase occurred in 1900 and 1901. With the exception of three years, the tonnage increased over that of the preceding year. To this increase steam vessels have contributed most largely, as the tonnage of the sailing vessels shows an actual decrease during many years.

The enrolled and licensed vessels, which engage in trade on the coasts and inland waters, form the largest proportion of the merchant marine. In 1889 the tonnage of these vessels formed 76.3 per cent of the total, and this proportion has been increasing almost constantly each year until 1906, when it amounted to 85.9 per cent. With the exception of one year, 1894, there has been an actual increase each year in their tonnage.

Registered vessels are engaged primarily in foreign trade, and it is among this class of craft that the greatest decreases have occurred in both number and tonnage. The decrease, however, is in the sailing vessels, as the number and tonnage of the steam craft is larger in 1906 than in 1889. Not only has the proportion which registered vessels formed of the total merchant marine decreased, but during nine of the years there was an actual decrease in their tonnage. In 1906 as compared with 1889 there was a decrease of 240 in the number of these vessels and of 82,109 in their tonnage. The smallest registration, 737,709 tons, was reported for 1898, since which date there has been a slight increase except in 1900, 1902, and 1906. The largest registration reported for the period covered by the table, 1,021,595 tons, is shown for 1889.

In this connection it is interesting to know that 1,183 vessels, of 941,864 tonnage, valued at $87,503,676, reported to the Census that they carried freight to or from foreign ports during all or a portion of the year 1906. This, however, does not include the vessels operating on the Great Lakes, considerable numbers of which touch at Canadian ports, but it does include 523 canal boats, of 55,034 tonnage, valued at $584,190, which operate on the Champlain canal and Lake Champlain and visit ports in Canada. Of the 1,183 vessels, 489, of 538,082 tonnage, valued at $52,329,924, operated on the Atlantic coast, and 171, of 348,748 tonnage, valued at $34,589,562, on the Pacific coast.

CANAL BOATS.

For the purpose of this report all boats operated by the use of machinery have been included in the group of steam vessels, which therefore includes some ordinarily classed as canal boats. With this exception, the statistics for canal boats given in Table 50 represent all craft commonly known as such, although they may have been actually employed on canals during only a portion of the year 1906.

At the census of 1906 reports were secured for canal boats, irrespective of the waters in which they operated. In 1889 reports for such boats were secured in connection with other information obtained for the operations of the canals from the canal commissioners and other officers who have general supervision of the canal property. Comparative statistics are given in Table 60, which represents the floating equipment as reported by the officials in charge of the various canals. A comparison of the available data indicates that the number and tonnage of canal boats have been constantly decreasing. More than three-

fifths of them are now operated on the canals and other waters of New York state. Numbers of these boats winter in New York harbor, and are used for conveying freight on the surrounding waters and between points on the coast. The 8 canal boats reported for the Great Lakes and the Mississippi river are used as harbor barges and could properly be classed as such.

TABLE 50.—*Canal boats, by divisions: 1906.*[1]

DIVISION.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.
Total	[2]2,237	303,581	$2,952,197	$3,338,347	2,772	$1,015,591
Atlantic coast and Gulf of Mexico	663	103,877	1,112,475	943,552	652	281,599
Great Lakes and St. Lawrence river	6	1,134	13,800	7,790	15	2,801
Mississippi river and its tributaries	2	323	4,100	12,500	8	2,000
Canals and other inland waters of New York state	1,364	173,388	1,583,835	2,049,277	1,582	588,672
All other inland waters	202	24,859	237,987	325,228	515	140,519

[1] This table does not include steam canal boats.
[2] Does not include 49 boats with 5,745 gross tonnage that were idle during the entire year.

There were 138 steam canal boats reported at the census of 1889, of 14,676 tonnage, valued at $453,000. The statistics for steam craft of this class as reported for the census of 1906 are presented in Table 51.

TABLE 51.—*Steam vessels operating on canals: 1906.*

	1906
Number of vessels	84
Gross tonnage	7,280
Value of vessels	$418,800
Gross income	$370,101
Number of employees	362
Wages	$145,701
Freight carried (net tons)	189,522

There has been a decided decrease in the number of canal boats since the census of 1889, and while it is possible that the number propelled by steam decreased from 138 to 84, it may be that some boats of this class which operated on canals and also on other waters were classed as canal boats in 1889 but as steam vessels other than canal boats in 1906. The figures for the two censuses should therefore not be used to show the increase or decrease.

CANALS AND CANALIZED RIVERS.

In connection with the statistics for canal boats it is important to present information for the waters on which they are operated. For convenience the data for canals and canalized rivers will be considered as representing one general group. Canals may be divided into three classes, according as they are owned and operated by the Federal Government, by state governments, or corporations.

Canalized rivers are streams which have been made navigable, or on which navigation has been improved, by the construction of locks or dams. In all instances, except on the Illinois river at Henry and Copperas creek, the locks on the canalized rivers are owned and operated by the Federal Government, which either constructed or purchased them. While most of the state and corporation canals are used only for the transportation of freight in canal boats, the Government canals are all ship canals and the canalized rivers are classed as such.

All data in this report relative to canals or canalized rivers operated by the Federal Government are for the fiscal year ending June 30, unless otherwise noted, and were obtained from the annual reports of the chief of engineers of the United States Army; those for state and corporation canals are for the calendar year and were obtained directly from the canal officials.

TABLE 52.—*Number, mileage (including slack water), and cost of canals and canalized rivers in the United States: 1906, 1889, and 1880.*

	Total.	State and corporation canals.	Government canals.	Canalized rivers.
Number:				
1906	64	29	12	23
1889	67	37	9	21
1880	52	39	2	11
Mileage:				
1906	3,644.60	2,046.01	78.19	1,520.40
1889	3,383.27	2,264.60	40.63	1,078.04
1880	3,235.78	2,746.18	10.00	479.60
Cost:				
1906	$283,208,863	$213,797,297	$26,524,588	$42,886,978
1889	188,185,880	150,481,825	20,517,133	17,186,922
1880	183,952,302	167,205,810	7,832,009	8,914,483

While there has been a decrease of 700.17 miles since 1880 in the mileage of canals operated under state and corporation ownership, the mileage of canals owned by the Federal Government increased 68.19 miles, and that of canalized rivers 1,040.80 miles. The net increase in mileage of canals and canalized rivers in 1906 over 1880 is 408.82 miles. In order, however, to show the total increase since the latter census, the mileage of canals abandoned since 1880 should be considered.

TABLE 53.—*Length and cost of abandoned canals and canalized rivers: 1906, 1889, and 1880.*

	Length (miles).	Cost of construction and improvement.
Total	2,841.27	$73,168,795
Abandoned canals up to 1880	1,953.56	44,013,166
Abandoned canals, 1880 to 1889	261.69	7,157,850
Abandoned canals, 1889 to 1906	626.02	21,997,779

The mileage of canals and canalized rivers abandoned since 1880 amounts to 887.71 miles, which, added to the 408.82 miles of increase given in Table 52, shows an increase of 1,296.53 miles of canals or canalized rivers operated since 1880.

Between 1889 and 1906 there were 626.02 miles of canals and canalized rivers abandoned, while the in-

crease in mileage shown in Table 52 amounts to 261.33, indicating an increase of 887.35 miles of canals or canalized rivers operated since the Eleventh Census. In 1889, however, the Chesapeake and Ohio canal, built and enlarged during the period from 1828 to 1850, with a length of 186 miles, inclusive of 5 miles of slack water, was omitted, as the canal was not operated during that year. The actual increase in mileage, therefore, in 1906 over 1889 would be but 701.35 miles.

Since 1880 there has been a large decrease in the mileage of canals operated by states or corporations, and an increase in the mileage of Government canals and canalized rivers which, with the exceptions already mentioned, are controlled by the Federal Government.

Of the 626.02 miles of canals and canalized rivers abandoned since the Eleventh Census, 522.32 miles were state or corporation canals and 103.70 miles canalized rivers.

TABLE 54.—*Name, length, and cost of construction of canals and canalized rivers abandoned between 1889 and 1906.*

STATE AND NAME.	Length (miles).	Cost to and including 1889.
Aggregate	626.02	$21,997,779
State and corporation canals	522.32	21,045,950
New York:		
Erie and branches (part)	26.26	.....
Delaware and Hudson (part)	102.00	6,274,210
New Jersey:		
Penns Neck	2.02	41,000
Pennsylvania:		
Pennsylvania	193.00	7,731,750
Susquehanna and Tidewater	45.00	4,931,345
Muncy	0.75	7,077
Schuylkill Navigation Company (part)	18.35	.....
Virginia:		
Albemarle and Chesapeake (part)	29.94	.....
Dismal Swamp (part)	6.00	.....
North Carolina:		
Fairfield (part)	0.50	.....
Illinois:		
Illinois and Michigan (part)	6.00	.....
Georgia:		
Ogeechee	16.00	407,818
Florida:		
Santa Fe	10.50	70,000
Ohio:		
Walhonding	19.00	607,269
Hocking	42.00	975,481
Miami and Erie (part)	5.00	.....
Canalized rivers	103.70	951,829
Maine:		
Songo	7.00	20,000
New York:		
Black	42.50	.....
Oneida	20.00	368,164
Seneca	7.70	.....
Pennsylvania:		
Beaver	6.00	19,000
Virginia:		
Upper Appomattox	11.50	388,617
Wisconsin:		
Chippewa	9.00	156,048

The cost of the improvements abandoned between 1889 and 1906 for which cost is shown amounted to $21,997,779. This sum is low, however, as the cost of abandoned portions, which can not be estimated, must have been considerable.

The cost of the canals and canalized rivers in operation in 1906 amounted to $283,208,863, and the cost of similar improvements abandoned up to that year was $73,168,795, making a grand total of $356,377,658 expended by the Federal Government, by states, or corporations, on canals or the canalization of rivers.

The comparatively small increase in mileage and cost between 1880 and 1889 is probably due to the exclusion in the latter year of the Chesapeake and Ohio canal. The inclusion at the present census of this canal, as well as the Chicago Drainage and Ship canal, which was only completed in 1900, accounts in a great measure for the large increase in cost of these public waterways in 1906 as compared with 1889. The Chesapeake and Ohio canal is reported as having cost, with improvements, $14,000,000, and the Chicago Drainage and Ship canal $52,697,495.

For none of the Government canals or the canalized rivers under Government control is any income or expense account shown, although both classes of waterways require an expenditure for maintenance. For the fiscal year ending June 30, 1906, the amount allotted under the permanent indefinite appropriation, provided by the act of July 5, 1884, for the care and maintenance of Government canals and canalized rivers was $1,108,710. No tolls were charged on the waterways under Federal control. Neither are any tolls charged on the canals owned and operated by the state of New York. The canals of New York state were maintained by taxation and the charge for maintenance for the fiscal year ending September 30, 1906, amounted to $1,191,171.

Of the remaining 24 canals under state or corporation ownership, 3, the Chicago Drainage and Ship canal, the Newbern and Beaufort canal, and the Morris and Cummings canal, did not report any income or expenditure for 1906, and such items for the Illinois and Michigan canal could not be separated from the records for the locks on the Illinois river at Henry and Copperas creek, which are operated by the state of Illinois. The 20 canals which did report income and expense derived a total revenue of $1,235,608 and were operated at a cost of $1,281,361.

TABLE 55.—*Tons of freight carried on state and corporation canals, Government canals, and canalized rivers: 1906, 1889, and 1880.*

[The figures in this table represent the freight tonnage carried on the canals of the United States, each canal being regarded as a single unit.]

CLASS.	1906	1889	1880
Total	122,434,405	48,668,325	21,044,292
State and corporation canals	6,606,814	13,269,600	16,304,323
Government canals	96,729,333	28,904,209	1,244,279
Canalized rivers	19,098,258	6,494,516	3,495,690

The amount of freight carried on the canals and canalized rivers in 1906 exceeded that carried in 1889 by 73,766,080 tons, or 151.6 per cent, and exceeded that carried in 1880 by 101,390,113 tons, or 481.8 per cent.

While there is a decrease of 50.2 per cent since 1889 and of 59.5 per cent since 1880 in the amount of freight

carried on state and corporation canals, the increased tonnage carried on Government canals amounted to 234.7 per cent more than in 1889 and 7,673.9 per cent more than in 1880, and that carried on canalized rivers was 194.1 per cent greater than in 1889 and 446.3 per cent greater than in 1880.

Of all the freight, a little over 75 per cent passed through the St. Clair Flats canal, which connects Lake St. Clair with the St. Clair river, and the St. Marys Falls canal, which connects Lake Superior with Lake Huron. These two canals are controlled and operated by the Federal Government.

There is necessarily a duplication in the total quantity of freight carried on all canals; for example, a large proportion of the freight reported for the St. Marys Falls canal is included in the report for the St. Clair Flats canal and duplicated when the totals for the canals are combined.

In 1906 the freight tonnage passing through the St. Clair Flats canal aggregated 51,359,071 tons, an increase over 1889 of 160.5 per cent. The freight tonnage carried through the canal around St. Marys Falls in 1880 was only 1,244,279 tons; in 1889 it amounted to 7,516,022 tons; while in 1906 it was 41,276,862 tons, or 3,217.3 per cent greater than in 1880 and 449.2 per cent more than in 1889.

TABLE 56.—*Net tonnage of vessels and total freight passing through both American and Canadian canals at Sault Ste. Marie: 1895 to 1906.*[1]

YEAR.	Net registered tonnage.	Total freight (tons).
1906	37,570,191	46,015,016
1905	36,617,699	44,270,680
1904	24,364,138	31,546,106
1903	27,736,444	34,674,437
1902	31,955,582	35,961,146
1901	24,626,976	28,403,065
1900	22,315,834	25,643,073
1899	21,958,347	25,255,810
1898	18,622,754	21,234,664
1897	17,619,933	18,982,755
1896	17,249,418	16,239,061
1895	16,806,781	15,062,580

[1] This table is compiled from the annual report of the Chief of Engineers of the United States Army, for the fiscal year ending June 30, 1906.

The American canal at Sault Ste. Marie was first opened to navigation in 1855, and during that year the vessels passing through the canal carried 14,503 tons of freight. Up to 1895 the freight that passed through the canal amounted to 101,244,462 tons, while from 1895 to 1906 it amounted to 343,288,393 tons, making a grand total of 444,532,855 tons of freight from the opening in 1855 to June 30, 1906.

TABLE 57.—*Net tons of freight carried on ship canals and all other canals: 1906, 1889, and 1880.*

[The figures in this table represent the freight tonnage carried on the canals of the United States, each canal being regarded as a single unit.]

	1906	1889	1880
Total	122,434,405	48,668,325	21,044,292
Ship canals	118,114,267	38,905,820	5,076,391
All other	4,320,138	9,762,505	15,967,901

Of the total freight carried on canals during 1880, 24.1 per cent was transported on ship canals and 75.9 per cent on other canals; in 1889 the corresponding figures were 79.9 per cent and 20.1 per cent; in 1906 they were 96.5 per cent and 3.5 per cent. These figures show the decrease in the transportation of freight in canal boats and the tendency to use ship canals through which larger vessels can pass rather than the old style towpath canal of narrow width and little depth.

TABLE 58.—*Net tonnage of vessels on St. Marys Falls, Suez, and Kaiser Wilhelm canals: 1895 to 1906.*[1]

ST. MARYS FALLS.[2]		SUEZ.		KAISER WILHELM.	
Calendar year.	Net tonnage.	Calendar year.	Net tonnage.	Year ending March 31—	Net tonnage.[3]
1895	16,806,781	1895	8,448,383	1895	
1896	17,249,418	1896	8,560,284	1896	[4] 1,505,983
1897	17,619,933	1897	7,899,374	1897	1,848,458
1898	18,622,754	1898	9,238,603	1898	2,469,795
1899	21,958,347	1899	9,895,630	1899	3,117,840
1900	22,315,834	1900	9,738,152	1900	3,488,767
1901	24,626,976	1901	10,823,840	1901	4,282,094
1902	31,955,582	1902	11,248,413	1902	4,285,301
1903	27,736,444	1903	11,907,288	1903	4,573,834
1904	24,364,138	1904	13,401,835	1904	4,990,287
1905	36,617,699	1905	13,132,694	1905	5,270,477
1906	41,098,324	1906	13,443,392	1906	5,796,949

[1] The figures for this table are compiled from the Monthly Summary of Commerce and Finance of the United States, Bureau of Statistics, Department of Commerce and Labor, from the reports of the British Statistical Department, Ministry of Finance, and from the Quarterly Statistical Reports of Germany.
[2] Traffic through the Canadian canal is included in these figures.
[3] Not including German war vessels and vessels of the canal administration.
[4] Covers July 1, 1895, to June 30, 1896 (the first year after opening).

Although the Suez canal is usually considered the most important example of ship canals, the net tonnage of vessels passing through it is much less than that of vessels passing through St. Marys Falls canal. In 1906 the net tonnage of vessels passing through St. Marys Falls canal was over three times as great as that for the Suez canal, and over seven times as great as that for the Kaiser Wilhelm, or Kiel, canal. This is all the more remarkable in consideration of the fact that while the Suez and Kiel canals are open for the entire year, the St. Marys Falls canal, because of the severity of the winter, is open to traffic for only about eight months. The St. Marys Falls canal is also remarkable because of its short length, number of locks, and immense traffic.

TABLE 59.—*Dimensions and cost of construction of Suez, Manchester, Kaiser Wilhelm, and St. Marys Falls canals.*[1]

CANAL.	Length (miles).	Depth (feet).	Locks (number).	Cost.
Suez	90.0	31.0		$100,000,000
Manchester	35.5	26.0	4	75,000,000
Kaiser Wilhelm	61.0	29.5	[2] 2	40,000,000
St. Marys Falls	2.7	25.0	3	[3] 13,000,000

[1] The figures for this table are compiled from the Monthly Summary of Commerce and Finance of the United States for January, 1905, Bureau of Statistics, Department of Commerce and Labor.
[2] Tidal locks.
[3] Includes cost of Canadian lock and approaches, which was obtained from the annual report of the Chief of Engineers of the United States Army for the fiscal year ending June 30, 1906.

No reliable data were obtainable as to the number, tonnage, or valuation of boats using the waterways

classed as ship canals. Table 60 shows such data only for those canals operated in 1906 on which the freight is transported by canal boats and which are all under state or corporation ownership.

TABLE 60.—*Floating equipment—number, tonnage, and valuation of canal boats on other than ship canals: 1906 and 1889.*

CANAL.	1906			1889		
	Number.	Tonnage.	Valuation.	Number.	Tonnage.	Valuation.
Total	(1)	465,515	(1)	5,544	808,058	$4,823,625
Chesapeake and Ohio	120	13,920	$84,000	(2)	(2)	(2)
Morris	(2)	(2)	(2)	314	24,120	92,275
Delaware and Hudson	18	2,700	18,000	750	105,000	681,500
Erie, Oswego, Cayuga and Seneca	(1)	358,905	(1)	1,743	406,061	2,403,500
Champlain	540	54,000	648,000	954	97,597	893,450
Black River	63	6,300	77,331	110	10,345	94,950
Ohio, Miami and Erie	(2)	(2)	(2)	275	22,000	82,500
Lehigh Coal and Navigation Company	127	15,500	63,000	1,273	120,935	509,200
Schuylkill Navigation Company	42	6,190	30,200	125	22,000	66,250

[1] The number and valuation of boats operating on the Erie, Oswego, Cayuga and Seneca canals were not reported and therefore no total could be made for these items.
[2] Not in operation in 1889.
[3] Did not report floating equipment in 1906.

Of the 12 canals for which floating equipment is shown, 7 are operated by the states in which they are located and 5 by corporations. The great decrease in the number, tonnage, and valuation of the boats using these canals in 1906 as compared with 1889 is due to the decreased use of canals whose dimensions and locks do not permit boats of large tonnage to pass.

TABLE 61.—*Tons of freight carried on state and corporation canals, Government canals, and canalized rivers: 1906, 1889, and 1880.*[1]

CLASS, STATE, AND NAME.	1906	1889	1880
Aggregate	122,434,405	48,668,325	21,044,292
State and corporation canals	6,606,814	13,269,600	16,304,323
Government canals	96,729,333	28,904,209	1,244,279
Canalized rivers	19,098,258	6,494,516	3,495,690
State and corporation canals	6,606,814	13,269,600	16,304,323
New York	3,627,907	6,816,304	7,766,969
Erie and branches	2,385,491	3,673,554	4,608,651
Champlain	740,983	1,187,038	1,200,503
Oswego	172,228	170,078	427,863
Cayuga and Seneca	164,874	196,138	125,331
Black River	77,331	143,561	75,308
Delaware and Hudson	87,000	1,445,935	1,329,313
New Jersey	513,043	1,738,905	1,857,568
Delaware and Raritan	424,986	1,276,269	1,348,082
Morris	88,057	462,636	503,486
Penns Neck	(2)	(2)	6,000
Pennsylvania	294,979	1,359,665	2,607,535
Pennsylvania	(2)	423,073	861,798
Susquehanna and Tidewater	(2)	125,555	362,295
Schuylkill Navigation Co	54,354	219,697	630,416
Lehigh Coal and Navigation Co	240,625	591,340	719,338
Union	(2)	(3)	29,853
Muncy	(2)	(2)	3,835

[1] The figures relating to Government canals and canalized rivers were obtained from the report of the Chief of Engineers of the United States Army for the fiscal year ending June 30, 1906, and those for state and corporation canals directly from the canal officials.
[2] Abandoned since 1889.

TABLE 61.—*Tons of freight carried on state and corporation canals, Government canals, and canalized rivers: 1906, 1889, and 1880*—Continued.

CLASS, STATE, AND NAME.	1906	1889	1880
Delaware:			
Chesapeake and Delaware	683,086	736,879	959,146
Virginia	435,404	395,004	532,662
Albemarle and Chesapeake	95,269	316,793	400,000
Lake Drummond (Dismal Swamp)	340,135	78,211	6,731
Alexandria and Georgetown	(4)	(4)	125,931
North Carolina		2,124	40,000
Fairfield	(3)	2,124	40,000
Newbern and Beaufort	(3)	(3)	(4)
Georgia	7,004	40,392	23,002
Augusta	7,004	23,668	2,697
Ogeechee	(3)	16,724	20,905
Louisiana	683,900	293,070	318,096
New Basin	500,000	226,594	177,108
Old Basin	60,000	66,476	140,988
Harvey's	50,000	(3)	(3)
Company's	50,000	(3)	(3)
Secolas	(3)	(3)	(3)
Lake Borne	23,900	(3)	(3)
Ohio	84,052	1,107,176	791,962
Ohio and branches	8,818	129,398	429,626
Walhonding	(3)	948	3,309
Hocking	(3)	7,353	35,290
Miami and Erie	75,234	969,477	323,737
Illinois	6,470	742,391	751,360
Illinois and Michigan	6,470	742,391	751,360
Chicago Drainage and Ship	(5)	(5)	(5)
Maryland:			
Chesapeake and Ohio	225,143	(6)	655,423
Florida:			
Santa Fe	(3)	1,000	(3)
Oregon:			
Portland General Electric Co	43,826	36,690	(3)
Texas:			
Morris and Cummings	2,000	(3)	(3)
Government canals	96,729,333	28,904,209	1,244,279
Kentucky:			
Louisville and Portland	1,053,526	618,060	(3)
Iowa:			
Des Moines Rapids	8,520	794,280	(3)
Michigan	95,049,378	27,491,869	1,244,279
St. Marys Falls	41,276,862	7,516,022	1,244,279
Lake Superior[7]	2,413,445	[8] 257,987	(3)
St. Clair Flats[7]	51,359,071	19,717,860	(3)
Illinois:			
Illinois and Mississippi	699	(5)	
Wisconsin:			
Sturgeon Bay and Lake Michigan	617,210	(3)	(3)
Texas:			
Port Arthur	(3)	(5)	
Galveston and Brazos	(3)	(3)	(3)
Morgan	(3)	(3)	(5)
South Carolina:			
Fenwicks Island	(3)	(5)	
Esterville-Minim Creek	(3)	(5)	
Canalized rivers	19,098,258	6,494,516	3,495,690
Pennsylvania	16,091,000	3,294,932	3,450,400
Monongahela-Pennsylvania and West Virginia	11,447,444	3,294,932	3,450,400
Ohio	3,247,753	(3)	(3)
Allegheny	1,395,803	(5)	(5)
Ohio:			
Muskingum[7]	50,668	10,281	45,290

[3] Not reported.
[4] Abandoned since 1880.
[5] Not opened.
[6] Canal not in operation in 1889.
[7] Fiscal year ending June 30, 1905.
[8] Includes Keweenaw Bay and Portage Lake canals.

TABLE 61.—*Tons of freight carried on state and corporation canals, Government canals, and canalized rivers: 1906, 1889, and 1880*—Continued.

CLASS, STATE, AND NAME.	1906	1889	1880
West Virginia	1,720,399	1,260,859	.....
Great Kanawha [1]	1,613,889	1,145,202	(2)
Little Kanawha [1]	106,510	115,657	(2)
Monongahela	(2)	(2)	(2)
Kentucky	729,428	1,076,228	.....
Kentucky [1]	201,510	256,950	(2)
Green and Barren	342,495	819,278	(2)
Big Sandy [1]	148,623	(4)	(2)
Rough	36,800	(5)	(5)
Illinois	33,178	180,264	.....
Illinois	24,943	180,264	(2)
Wabash	3,990	(3)	(5)
Galena	4,245	(5)	(5)
Wisconsin	263,589	671,952	.....
Fox [1]	263,589	346,475	(2)
Chippewa	(2)	325,477	(2)
South Carolina:			
Congaree	(2)	(2)	(5)
Arkansas:			
Upper White	7,999	(2)	(2)
Tennessee	136,805	.....	.....
Cumberland [1]	119,009	(2)	(5)
Muscle Shoals [1] (Tennessee)	17,796	(2)	(5)
Alabama	16,281	.....	.....
Black Warrior	16,281	(2)	(2)
Coosa	(4)	(2)	(2)
Oregon	48,911	.....	.....
Columbia	46,884	(2)	(2)
Yamhill	2,027	(4)	(5)

[1] Fiscal year ending June 30, 1905. [2] Not reported. [3] Included in data for this river in Pennsylvania. [4] Abandoned since 1889. [5] Not opened.

TABLE 62.—NUMBER, DIMENSIONS, DATE OF CONSTRUCTION, AND COST OF STATE AND CORPORATION CANALS, GOVERNMENT CANALS, AND CANALIZED RIVERS: 1906.[1]

CLASS, STATE, AND NAME.	Points connected.	Number of canals.	Opened for traffic.	LENGTH. Total (miles).	LENGTH. Canal (miles).	LENGTH. Slack water (miles).	WIDTH. Surface (feet).	WIDTH. Bottom (feet).	Depth (feet).	LOCKS. Number.	LOCKS. Length (feet).	LOCKS. Width (feet).	Cost of construction and improvement.
Aggregate		64	.....	3,644.60	2,022.88	1,621.72	.....	.....	.....	934	.....	.....	$283,208,863
State and corporation canals		29	.....	2,046.01	1,949.09	96.92	.....	.....	.....	784	.....	.....	213,797,297
Government canals		12	.....	78.19	73.79	4.40	.....	.....	.....	12	.....	.....	26,524,588
Canalized rivers		23	.....	1,520.40	.....	1,520.40	.....	.....	.....	138	.....	.....	42,886,978
State and corporation canals		29	.....	2,046.01	1,949.09	96.92	.....	.....	.....	784	.....	.....	213,797,297
New York		6	.....	549.90	539.90	10.00	.....	.....	.....	242	.....	.....	76,825,458
Erie and branches [2]	Albany-Buffalo	.....	1825	355.13	355.13	.....	70	56	7	72	110	18	65,402,033
Champlain [2]	Whitehall-Albany	.....	1822	81.00	73.00	8.00	50	35	5	23	110	18	
Oswego [2]	Oswego-Syracuse	.....	1828	38.00	38.00	.....	70	56	7	18	110	18	5,161,793
Cayuga and Seneca [2]	Montezuma-Geneva	.....	1839	24.77	22.77	2.00	70	56	7	10	110	18	2,232,632
Black River and feeders [2]	Rome-Lyons Falls	.....	1849	42.00	42.00	.....	42	28	4	109	90	15	3,964,000
Delaware and Hudson	Eddyville-High Falls	.....	1828	9.00	9.00	.....	50	30	7	10	100	15	65,000
New Jersey		3	.....	172.00	172.00	.....	.....	.....	.....	49	.....	.....	11,113,749
Delaware and Raritan [3]	New Brunswick-Bordentown	.....	1838	44.00	44.00	.....	80	40	9	13	220	24	5,113,749
Delaware and Raritan feeder	Bull Island-Trenton	.....		22.00	22.00	.....	60	30	9	4	100	24	
Morris	Jersey City-Easton, Pa	.....	1836	106.00	106.00	.....	50	30	5	32	95	20	6,000,000
Maryland:													
Chesapeake and Ohio	Washington, D. C.-Cumberland, Md.	1	1850	185.00	181.20	3.80	68	31	6	75	100	15	14,000,000
Pennsylvania		2	.....	197.88	146.26	51.62	.....	.....	.....	146	.....	.....	18,085,334
Schuylkill Navigation Co.	Philadelphia-Port Clinton	.....	1826	89.88	50.26	39.62	58	40	6	55	110	18	11,018,875
Lehigh Coal and Navigation Co.	Coalport-Easton-Bristol	.....	1821	108.00	96.00	12.00	44	18	6	91	100	22	7,066,459
Delaware:													
Chesapeake and Delaware [3]	Delaware river-Chesapeake bay.	1	1829	29.63	13.63	16.00	60	40	10	3	220	24	5,000,000
Virginia		2	.....	37.00	36.00	1.00	.....	.....	.....	3	.....	.....	4,452,849
Albemarle and Chesapeake [3]	Chesapeake bay-Albemarle sound.	.....	1860	14.00	14.00	.....	80	45	10	1	220	40	1,151,849
Lake Drummond (Dismal Swamp) [3]	Elizabeth river, Va.-Pasquotank river, N. C.	.....	1794	23.00	22.00	1.00	70	40	9	2	250	39	3,301,000

[1] The figures relating to Government canals and canalized rivers were obtained from the reports of the Chief of Engineers of the United States Army and those for state and corporation canals directly from the canal officials.
[2] State canal.
[3] Ship canal.

TABLE 62.—NUMBER, DIMENSIONS, DATE OF CONSTRUCTION, AND COST OF STATE AND CORPORATION CANALS, GOVERNMENT CANALS, AND CANALIZED RIVERS: 1906—Continued.

CLASS, STATE, AND NAME.	Points connected.	Number of canals.	Opened for traffic.	LENGTH.			WIDTH.		Depth (feet).	LOCKS.			Cost of construction and improvement.
				Total (miles).	Canal (miles).	Slack water (miles).	Surface (feet).	Bottom (feet).		Number.	Length (feet).	Width (feet).	
North Carolina		2		9.00	9.00								895,000
Fairfield[1]	Fairfield and Alligator river.		1868	4.00	4.00		26	26	7				60,000
Newbern and Beaufort[1]	Clubfoot and Harlow creeks.		1882	5.00	5.00				5				35,000
Georgia:													
Augusta[1]	Augusta-Savannah river	1	1847	9.00	7.00	2.00	150	106	11	1	100	15	2,090,263
Louisiana		5		121.85	121.35	0.50				3			3,400,000
New Basin[1]	New Orleans-Lake Pontchartrain.		1835	7.50	7.00	0.50	100	90	9				2,000,000
Old Basin[1]	New Orleans-St. Johns bayou.		1794	7.00	7.00		60	40	7				150,000
Harvey's[1]	Mississippi river at New Orleans-Barataria bayou.		1830	5.35	5.35		70	65	6	1	184	30	400,000
Company's[1]	Mississippi river at New Orleans-Lafourche bayou.		1847	95.00	95.00		60	45	5.5	1	174	28	500,000
Lake Borne[1]	Mississippi river-Lake Borne.		1900	7.00	7.00		100	85	6	1	280	44	350,000
Texas:													
Morris and Cummings[1]	CorpusChristi-Aransas bay.	1	1873	9.00	9.00		100	60	8				125,000
Ohio		2		595.00	589.00	6.00				239			15,967,651
Ohio and branches[2]	Cleveland-Portsmouth		1835	326.00	326.00		40	26	4	144	90	15	7,904,971
Miami and Erie[2]	Toledo-Cincinnati		1835	269.00	263.00	6.00	50	35	5	95	90	15	8,062,680
Illinois		2		130.00	124.00	6.00				18			61,891,993
Illinois and Michigan[2]	Chicago-Lasalle		1848	96.00	96.00		60	30	8	1 17	110	48 18	9,194,498
Chicago Drainage and Ship[1]	Chicago-Lockport		1900	34.00	28.00	6.00	244	158	22				52,697,495
Oregon:													
Portland General Electric Co.[1]	Around Falls of Willamette river at Oregon City.	1	1873	0.75	0.75		75	55	6	5	210	40	750,000
Government canals		12		78.19	73.79	4.40				12			26,524,588
Michigan		3		10.54	10.54					2			13,282,305
St. Marys Falls	Around falls of St. Marys river.		1855	1.60	1.60		160		25	2	515 800	80 100	8,000,000
Lake Superior (including Keweenaw Bay and Portage Lake canals).	Lake Superior, Portage Lake, Keweenaw bay.		1873	7.75	7.75		120		20				4,246,728
St. Clair Flats	St. Clair river-Lake St. Clair.		1889	1.19	1.19				20				1,035,577
Illinois:													
Illinois and Mississippi	Around falls of Rock river, at Milan, Ill.	1	1895	4.50	4.50				7	3	170	35	547,230
Wisconsin:													
Sturgeon Bay and Lake Michigan Ship.	Sturgeon bay-Lake Michigan.	1	1881	1.36	1.36		160		21				504,596
Kentucky:													
Louisville and Portland	Around falls of Ohio river at Louisville	1	1830	2.40	2.40				12	2 2	390 260	80 50	5,856,230
South Carolina		2		5.33	5.33								222,175
Fenwicks Island	South Edisto and Ashepoo rivers.		1906	0.33	0.33		90		7				50,000
Esterville-Minim Creek	Santee river-Winyah bay		1906	5.00	5.00		90		6				172,175
Texas		3		42.06	42.06								1,445,163
Port Arthur	Taylors bayou-Sabine pass.		1899	7.13	7.13		183	75	25				803,490
Galveston and Brazos	Oyster bay-Brazos river		1853	29.50	29.50		37½		3				369,698
Morgan Canal and Cut	Galveston bay-Buffalo bayou.		1876	5.43	5.43		180		17				271,975
Iowa:													
Des Moines Rapids	Keokuk-Nashville Nashville-Montrose	1	1877	12.00	7.00	4.40	250		5	3	325	80	4,666,889
Canalized rivers		23		1,520.40		1,520.40				138			42,886,978
Arkansas:													
Upper White	8 miles above to 1 mile below Batesville.	1		9.00		9.00			5	2	175	36	684,110
Pennsylvania		3		151.50		151.50				21			9,747,795
Monongahela	Pittsburg-Dunkards creek		1888	89.00		89.00			5.4	6 6	216 182	56	3,954,466
Ohio	Pittsburg-Beaver		1885	36.50		36.50			6	6	600	110	4,668,561
Allegheny	Pittsburg-Natrona		1903	26.00		26.00			6	3	290	56	1,124,768

[1] Ship canal. [2] State canal.

TABLE 62.—NUMBER, DIMENSIONS, DATE OF CONSTRUCTION, AND COST OF STATE AND CORPORATION CANALS, GOVERNMENT CANALS, AND CANALIZED RIVERS: 1906—Continued.

CLASS, STATE, AND NAME.	Points connected.	Number of canals.	Opened for traffic.	LENGTH.			WIDTH.		Depth (feet).	LOCKS.			Cost of construction and improvement.
				Total (miles).	Canal (miles).	Slack water (miles).	Surface (feet).	Bottom (feet).		Number.	Length (feet).	Width (feet).	
West Virginia		3		179.00		179.00				22			$6,404,344
Great Kanawha	Loup creek shoals-Point Pleasant		1889	90.00		90.00			6	4	300	50	4,165,650
										6	340	55	
Little Kanawha	Parkersburg-Creston		1889	48.00		48.00			4	5	143	23	519,107
Monongahela	State line-Fairmount		1899	41.00		41.00			7	7	182	56	1,719,587
South Carolina:													
Congaree	Gervais street bridge, Columbia-Granby.	1	1906	2.00		2.00			5	1	150	55	221,238
Ohio:													
Muskingum	Zanesville-Marietta	1	1840	75.00		75.00			7	10	160	36	2,121,738
Illinois		3		241.00		241.00				6			3,193,706
Illinois[1]	Lasalle-Grafton		1889	227.00		227.00			7	4	350	75	2,963,706
Wabash	Grand Rapids at Mt. Carmel.		1893	12.00		12.00			3.5	1	214	52	130,000
Galena			1894	2.00		2.00			2	1	307	52	100,000
Wisconsin:													
Fox	Portage city-Green Bay	1	1856	160.40		160.40			5	27	160	35	3,149,295
Kentucky		4		469.50		469.50				22			4,656,564
Kentucky	Carrollton-College Hill		1889	200.00		200.00			5	5	145	38	2,798,922
										6	148	52	
Green and Barren	Mouth Green river-Mammoth Cave.		1889	193.00		193.00			5	7	145	36	661,635
	Mouth Barren river-Bowling Green.			20.00		20.00							
Big Sandy	Louisa-Kavanaugh		1889	27.00		27.00			6	3	190	52	1,091,108
Rough	Mouth-Hartford		1896	29.50		29.50			6	1	123	27	104,899
Tennessee		2		94.50		94.50				14			5,424,363
Cumberland	Nashville above and below.		1889	76.50		76.50			6	3	280	52	2,232,637
Tennessee	Around Muscle shoals		1889	14.50		14.50				9	285	60	3,191,726
	Around Elk river shoals		1889	3.50		3.50			5	2	285	60	
Alabama		2		116.00		116.00				10			3,264,811
Black Warrior	12 miles above Tuscaloosa-79 miles below Tuscaloosa.		1889	91.00		91.00			6.5	7	322	52	2,223,883
Coosa	Greenport, Ala., to 25 miles below.		1888	25.00		25.00			4	3	175	40	1,040,928
Oregon		2		22.50		22.50				3			4,019,014
Yamhill	Mouth-McMinnville		1900	18.00		18.00			5	1	265	40	202,620
Columbia	Around the Cascades		1889	4.50		4.50			8	2	462	92	3,816,394

[1] The Federal Government controls 139 miles and the state of Illinois 88 miles.

CONGRESSIONAL APPROPRIATIONS.

For many years the Federal Government has been expending large sums of money for the survey, improvement, and maintenance of the harbors and waterways of the United States. The first appropriation for this purpose was made in 1802, when Congress authorized the Secretary of the Treasury to expend a sum not exceeding $30,000 on public piers in the Delaware river.

The data on this subject have been compiled from the reports of the Chief of Engineers of the United States Army. The figures are from the compilation of preliminary examinations, surveys, projects, and appropriations prepared in accordance with section 13 of the rivers and harbors act of June 13, 1902, and published in House Document 421, Fifty-seventh Congress, second session, from the report of the chief of engineers for the fiscal year ending June 30, 1906, and the rivers and harbor acts of March 2, 1907. The differences which exist between the figures shown at the census of 1890 and those presented at the present census for the period up to and including that year are due either to the inclusion of some figures in the present report under a different locality from the one shown in 1890, to the diversion of appropriations from the original project, or to apparent errors in the earlier census.

The Congressional appropriations in Table 63 are arranged according to districts corresponding with those followed in presenting the statistics for water transportation.

TABLE 63.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the United States, by periods and divisions.*

DIVISION.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1802	[1]$552,943,525	$214,039,886	$301,447,546	$37,456,093
Atlantic coast	1802	141,162,891	56,448,541	73,821,826	10,892,524
Gulf of Mexico	1826	64,292,362	21,065,470	38,027,940	5,198,952
Pacific coast	1852	34,061,782	10,248,592	21,204,844	2,608,346
Great Lakes	1823	97,791,108	37,522,937	50,980,283	9,287,888
Mississippi valley	1909	208,484,720	84,211,783	115,457,054	8,815,883
Lake Champlain	1836	1,347,910	1,133,660	211,750	2,500
General	1824	[2]5,802,752	3,408,903	1,743,849	650,000

[1] Does not include appropriations for the following: California Debris Commission; Permanent International Commission of Congresses of Navigation; International Waterway Commission; improvement of harbors and waterways in insular possessions; prevention of deposits in New York harbor; bridge construction.

[2] Includes general appropriation items for removal of wrecks, examinations, surveys, and contingencies which are not capable of being segregated according to divisions.

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Up to and including 1890 the Congressional appropriations amounted to 38.7 per cent of the total shown in this table. From 1891 to 1906, inclusive, 54.5 per cent of the total was appropriated, while the rivers and harbors act of March 2, 1907, authorized the expenditure of 6.8 per cent. The waterways of the Mississippi valley, including the Red River (of the North), have received 37.7 per cent of all Congressional appropriations for the improvement and maintenance of harbors and waterways; the harbors and streams of the Atlantic coast, 25.5 per cent; those of the Great Lakes, 17.7 per cent; the Gulf of Mexico, including the delta and passes of the Mississippi, 11.6 per cent; the Pacific coast, 6.2 per cent; and Lake Champlain, two-tenths of 1 per cent.

TABLE 64.—ALL VESSELS, BY CLASS.

	CLASS, OCCUPATION, AND DIVISION.	Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
1	Aggregate	37,321	12,893,429	11,484,833	7,952	562	1,406	7	3,378,453	73,204	88
2	Steam	9,927	4,059,521	2,918,476	7,952	562	1,406	7	3,378,453	73,204	88
3	Freight and passenger	3,615	3,411,588	2,474,183	2,766	285	564	.....	2,255,295	20,417	.....
4	Tugs and other towing vessels	3,079	261,375	174,373	2,428	27	624	.....	637,950	7,336	.....
5	Ferryboats	536	261,073	187,238	188	228	113	7	264,414	1,245	.....
6	Yachts	2,176	82,275	54,123	2,093	7	76	.....	162,032	39,871	80
7	All other	521	43,210	28,559	477	15	29	.....	58,762	4,335	8
8	Sail	7,131	1,704,277	1,539,513	.....	.....	.....	.....	.....	.....	.....
9	Freight and passenger	5,181	1,672,862	1,510,658	.....	.....	.....	.....	.....	.....	.....
10	Yachts	1,594	24,155	22,176	.....	.....	.....	.....	.....	.....	.....
11	All other	356	7,260	6,679	.....	.....	.....	.....	.....	.....	.....
12	Unrigged	20,263	7,129,631	7,026,844	.....	.....	.....	.....	.....	.....	.....
13	Canal boats	2,237	303,581	292,386	.....	.....	.....	.....	.....	.....	.....
14	All other	18,026	6,826,050	6,734,458	.....	.....	.....	.....	.....	.....	.....
15	Atlantic coast and Gulf of Mexico	20,032	4,851,421	4,186,451	4,858	370	183	2	1,712,382	45,932	64
16	Steam	5,413	1,457,894	972,320	4,858	370	183	2	1,712,382	45,932	64
17	Freight and passenger	1,523	1,045,811	704,560	1,225	194	104	.....	992,963	10,214	.....
18	Tugs and other towing vessels	1,690	148,992	90,021	1,606	11	73	.....	381,051	1,506	.....
19	Ferryboats	270	162,834	113,531	111	156	1	2	158,140	195	.....
20	Yachts	1,577	70,461	45,228	1,573	1	3	.....	142,203	30,706	56
21	All other	353	29,796	18,980	343	8	2	.....	38,025	3,311	8
22	Sail	5,920	1,132,905	1,012,197	.....	.....	.....	.....	.....	.....	.....
23	Freight and passenger	4,227	1,105,901	987,398	.....	.....	.....	.....	.....	.....	.....
24	Yachts	1,358	21,046	19,317	.....	.....	.....	.....	.....	.....	.....
25	All other	335	5,958	5,482	.....	.....	.....	.....	.....	.....	.....
26	Unrigged	8,699	2,260,622	2,201,934	.....	.....	.....	.....	.....	.....	.....
27	Canal boats	663	103,877	101,195	.....	.....	.....	.....	.....	.....	.....
28	All other	8,036	2,156,745	2,100,739	.....	.....	.....	.....	.....	.....	.....
29	Pacific coast (including Alaska)	2,537	977,687	770,376	837	38	191	.....	435,020	10,697	.....
30	Steam	1,066	518,107	349,403	837	38	191	.....	435,020	10,697	.....
31	Freight and passenger	604	451,270	301,336	455	5	144	.....	355,849	6,333	.....
32	Tugs and other towing vessels	313	24,151	15,290	272	2	39	.....	47,764	2,520	.....
33	Ferryboats	47	40,171	31,018	10	31	6	.....	29,079	86	.....
34	Yachts	66	1,065	764	66	.....	.....	.....	810	1,237	.....
35	All other	36	1,450	995	34	.....	2	.....	1,518	521	.....
36	Sail	666	305,283	277,295	.....	.....	.....	.....	.....	.....	.....
37	Freight and passenger	547	302,798	275,060	.....	.....	.....	.....	.....	.....	.....
38	Yachts	104	1,459	1,298	.....	.....	.....	.....	.....	.....	.....
39	All other	15	1,026	937	.....	.....	.....	.....	.....	.....	.....
40	Unrigged	805	154,297	143,678	.....	.....	.....	.....	.....	.....	.....
41	Canal boats	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42	All other	805	154,297	143,678	.....	.....	.....	.....	.....	.....	.....
43	Great Lakes and St. Lawrence river	2,990	2,392,863	1,905,176	1,616	51	8	1	976,847	5,700	8
44	Steam	1,676	1,915,786	1,452,228	1,616	51	8	1	976,847	5,700	8
45	Freight and passenger	932	1,842,251	1,406,674	890	37	5	.....	811,004	1,333	.....
46	Tugs and other towing vessels	382	22,663	13,312	376	5	1	.....	89,451	164	.....
47	Ferryboats	48	35,581	21,621	43	3	1	1	49,001	116	.....
48	Yachts	236	6,210	4,280	235	.....	1	.....	12,387	3,923	8
49	All other	78	9,081	6,341	72	6	.....	.....	15,004	164	.....
50	Sail	531	265,571	249,535	.....	.....	.....	.....	.....	.....	.....
51	Freight and passenger	403	263,837	247,891	.....	.....	.....	.....	.....	.....	.....
52	Yachts	122	1,458	1,384	.....	.....	.....	.....	.....	.....	.....
53	All other	6	276	260	.....	.....	.....	.....	.....	.....	.....
54	Unrigged	783	211,506	203,413	.....	.....	.....	.....	.....	.....	.....
55	Canal boats	6	1,134	1,122	.....	.....	.....	.....	.....	.....	.....
56	All other	777	210,372	202,291	.....	.....	.....	.....	.....	.....	.....
57	Mississippi river and its tributaries	9,622	4,411,967	4,379,064	356	85	990	4	227,802	9,167	.....
58	Steam	1,435	146,227	129,227	356	85	990	4	227,802	9,167	.....
59	Freight and passenger	390	55,779	49,997	67	36	287	.....	78,451	2,241	.....
60	Tugs and other towing vessels	619	62,836	53,821	106	7	506	.....	114,696	2,851	.....
61	Ferryboats	166	22,180	20,791	22	35	105	4	27,372	848	.....
62	Yachts	222	3,255	2,923	146	6	70	.....	3,571	2,971	.....
63	All other	38	2,177	1,995	15	1	22	.....	3,712	256	.....
64	Unrigged	8,187	4,265,740	4,249,837	.....	.....	.....	.....	.....	.....	.....
65	Canal boats	2	323	323	.....	.....	.....	.....	.....	.....	.....
66	All other	8,185	4,265,417	4,249,514	.....	.....	.....	.....	.....	.....	.....

[1] The quantity of freight carried on the Great Lakes and St. Lawrence river was obtained from the report of the Bureau of Statistics on the internal commerce of the United States. As this report does not show separately the freight carried on each class of vessels, the total for the United States could not be obtained by classes.

OCCUPATION, AND DIVISION: 1906.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).[1]	
Iron.	Steel.	Wood.	Composite.		Freight.	Passengers.	All other.					
531	1,448	35,247	95	$507,973,121	$175,545,361	$43,645,365	$75,663,806	140,929	$71,636,521	366,825,663	[2]177,519,758	1
485	1,189	8,197	56	386,772,727	132,473,492	43,591,987	49,482,310	95,452	50,504,508	366,322,769	.....	2
218	690	2,690	17	286,218,089	119,869,929	33,114,629	8,111,773	61,908	30,579,417	35,302,577	.....	3
169	251	2,649	10	39,062,249	12,555,487	62,117	31,325,724	20,870	12,494,685	281,103	.....	4
64	92	379	1	29,578,380	.....	10,414,106	6,876,967	4,519	3,537,180	330,737,639	.....	5
13	121	2,016	26	24,281,861	.....	135	25,590	5,858	2,291,951	700	.....	6
21	35	463	2	7,632,148	48,076	1,000	3,142,256	2,297	1,601,275	750	.....	7
37	94	6,973	27	56,206,145	31,954,145	35,072	697,973	25,404	10,371,047	24,915	.....	8
34	76	5,069	2	51,415,756	31,953,165	33,272	482,276	22,945	9,641,346	23,475	.....	9
3	18	1,549	24	4,169,253	.....	.....	2,853	1,949	556,777	.....	.....	10
.....	.....	355	1	621,136	980	1,800	212,844	510	172,924	1,440	.....	11
9	165	20,077	12	64,994,249	11,117,724	18,306	25,483,523	20,073	10,760,966	477,979	.....	12
.....	9	2,227	1	2,952,197	2,951,753	.....	386,594	2,772	1,015,591	.....	.....	13
9	156	17,850	11	62,042,052	8,165,971	18,306	25,096,929	17,301	9,745,375	477,979	.....	14
414	734	18,827	57	273,105,915	83,890,161	25,643,332	50,226,431	77,124	38,352,259	292,555,416	65,360,958	15
385	608	4,388	32	193,926,327	57,803,325	25,601,845	32,039,317	45,388	24,433,617	292,292,820	19,340,893	16
156	239	1,123	5	121,136,485	48,644,095	18,185,239	5,418,472	25,177	11,773,117	19,508,104	19,109,272	17
140	183	1,363	4	25,894,551	9,152,820	29,693	21,272,061	11,276	7,528,564	188,046	222,540	18
61	66	143	.....	19,970,466	.....	7,386,913	3,184,621	2,388	2,098,540	272,596,670	.....	19
9	98	1,449	21	21,290,339	.....	.....	16,040	5,088	2,016,936	.....	.....	20
19	22	310	2	5,634,486	6,410	.....	2,148,123	1,459	1,016,460	.....	9,081	21
24	52	5,820	24	37,520,903	19,542,231	24,926	474,858	18,654	6,687,314	22,128	18,637,842	22
22	35	4,168	2	33,213,849	19,541,366	23,126	284,690	16,374	6,016,394	20,688	18,630,901	23
2	17	1,317	22	3,775,743	.....	.....	2,681	1,835	524,374	.....	.....	24
.....	.....	335	.....	531,311	865	1,800	187,487	445	146,546	1,440	6,941	25
5	74	8,619	1	41,658,685	6,544,605	16,561	17,712,256	13,082	7,231,328	240,468	27,382,223	26
.....	.....	663	.....	1,112,475	606,427	.....	337,125	652	281,599	.....	1,104,209	27
5	74	7,956	1	40,546,210	5,938,178	16,561	17,375,131	12,430	6,949,729	240,468	26,278,014	28
57	73	2,404	3	76,622,633	29,340,102	10,424,493	8,755,544	20,142	12,950,399	44,189,971	13,301,293	29
42	63	959	2	60,440,145	20,600,325	10,414,347	6,272,796	14,423	9,330,294	44,187,184	6,685,007	30
37	49	517	1	52,164,977	20,065,562	8,365,559	1,260,954	11,978	7,281,028	4,631,500	6,673,310	31
4	10	299	.....	3,353,927	534,463	10,208	2,761,267	1,548	1,248,085	22,580	11,637	32
.....	2	44	1	4,315,522	.....	2,037,580	2,170,850	759	708,777	39,532,354	.....	33
.....	1	65	.....	294,800	.....	.....	2,500	66	33,271	.....	.....	34
1	1	34	.....	310,919	300	1,000	77,227	72	59,133	750	60	35
12	8	645	1	11,533,171	8,090,122	10,146	199,483	4,481	2,719,571	2,787	3,437,372	36
12	8	527	.....	11,275,586	8,090,007	10,146	177,626	4,401	2,683,528	2,787	3,437,197	37
.....	.....	104	.....	174,119	.....	.....	100	28	11,890	.....	.....	38
.....	.....	14	1	83,475	115	.....	21,757	52	24,153	.....	175	39
3	2	800	.....	4,649,317	649,655	.....	2,283,263	1,238	900,534	.....	3,178,914	40
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41
3	2	800	.....	4,649,317	649,655	.....	2,283,263	1,238	900,534	.....	3,178,914	42
33	539	2,391	27	130,805,640	52,076,533	4,866,904	8,331,265	24,916	13,280,716	14,080,146	[3]75,609,649	43
32	457	1,172	15	116,983,812	47,227,424	4,866,904	4,245,899	20,515	11,179,882	14,080,146	.....	44
24	388	510	10	107,897,440	46,832,834	4,408,880	1,271,337	17,279	9,269,490	5,814,639	.....	45
6	33	342	1	2,630,097	357,944	1,168	2,115,009	1,650	1,081,913	1,025	.....	46
.....	14	34	.....	3,429,532	.....	456,856	465,962	656	308,156	8,264,482	.....	47
2	10	220	4	1,673,000	.....	.....	4,422	441	151,055	.....	.....	48
.....	12	66	.....	1,353,743	36,646	.....	389,149	480	369,268	.....	.....	49
1	34	494	2	7,135,271	4,317,542	.....	23,632	2,258	962,542	.....	.....	50
.....	33	370	.....	6,924,071	4,317,542	.....	19,960	2,161	940,174	.....	.....	51
1	1	118	2	204,850	.....	.....	72	84	20,143	.....	.....	52
.....	.....	6	.....	6,350	.....	.....	3,600	13	2,225	.....	.....	53
.....	48	725	10	6,686,557	531,567	.....	4,061,734	2,143	1,138,292	.....	.....	54
.....	.....	6	.....	13,800	6,500	.....	1,290	15	2,801	.....	.....	55
.....	48	719	10	6,672,757	525,067	.....	4,060,444	2,128	1,135,491	.....	.....	56
26	81	9,513	2	22,852,142	7,450,869	2,281,243	7,609,926	15,016	5,692,117	14,122,241	19,531,093	57
25	50	1,358	2	13,196,770	6,480,655	2,279,998	6,649,483	13,973	5,148,581	13,890,850	2,355,386	58
1	9	379	1	3,737,450	4,038,002	1,766,581	130,046	6,746	2,019,202	3,808,850	2,305,867	59
18	22	578	1	6,822,210	2,442,653	14,535	4,953,055	6,109	2,512,108	58,688	49,519	60
3	10	153	.....	1,776,360	.....	498,747	1,054,374	699	413,553	10,022,012	.....	61
2	9	211	.....	563,400	.....	135	1,988	165	59,168	700	.....	62
1	.....	37	.....	297,350	.....	.....	510,020	254	144,550	.....	.....	63
1	31	8,155	.....	9,655,372	970,214	1,245	960,443	1,043	543,536	231,391	17,175,707	64
.....	.....	2	.....	4,100	12,500	.....	.....	8	2,000	.....	23,250	65
1	31	8,153	.....	9,651,272	957,714	1,245	960,443	1,035	541,536	231,391	17,152,457	66

[2] Includes 2,003,453 net tons of bunker coal.

TABLE 64.—ALL VESSELS, BY CLASS,

	CLASS, OCCUPATION, AND DIVISION.	Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
67	Canals and other inland waters of New York state	1,648	209,152	196,323	138	8	5	.....	16,939	812	16
68	Steam	151	14,127	9,751	138	8	5	.....	16,939	812	16
69	Freight and passenger	79	11,521	7,940	66	8	5	.....	11,442	146	.....
70	Tugs and other towing vessels	38	1,868	1,284	38	.....	.....	.....	3,546	247	.....
71	Ferryboats	2	97	67	2	.....	.....	.....	72	.....	.....
72	Yachts	32	641	460	32	.....	.....	.....	1,879	419	16
73	Sail	13	495	468	.....	.....	.....	.....	.....	.....	.....
74	Freight and passenger	4	326	309	.....	.....	.....	.....	.....	.....	.....
75	Yachts	9	169	159	.....	.....	.....	.....	.....	.....	.....
76	Unrigged	1,484	194,530	186,104	.....	.....	.....	.....	.....	.....	.....
77	Canal boats	1,364	173,388	165,247	.....	.....	.....	.....	.....	.....	.....
78	All other	120	21,142	20,857	.....	.....	.....	.....	.....	.....	.....
79	All other inland waters	492	50,339	47,443	147	10	29	.....	9,463	896	.....
80	Steam	186	7,380	5,547	147	10	29	.....	9,463	896	.....
81	Freight and passenger	87	4,956	3,676	63	5	19	.....	5,586	150	.....
82	Tugs and other towing vessels	37	865	645	30	2	5	.....	1,442	48	.....
83	Ferryboats	3	210	210	.....	3	.....	.....	750	.....	.....
84	Yachts	43	643	468	41	.....	2	.....	1,182	615	.....
85	All other	16	706	548	13	.....	3	.....	503	83	.....
	Sail:										
86	Yachts	1	23	18	.....	.....	.....	.....	.....	.....	.....
87	Unrigged	305	42,936	41,878	.....	.....	.....	.....	.....	.....	.....
88	Canal boats	202	24,859	24,499	.....	.....	.....	.....	.....	.....	.....
89	All other	103	18,077	17,379	.....	.....	.....	.....	.....	.....	.....

OCCUPATION, AND DIVISION: 1906—Continued.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).	
Iron.	Steel.	Wood.	Composite.		Freight.	Passengers.	All other.					
1	10	1,634	3	$3,294,221	$2,198,920	$264,397	$318,287	2,472	$920,260	835,052	2,502,891	67
1	9	139	2	1,390,512	118,363	263,897	143,710	500	192,238	828,932	103,998	68
.....	5	74	.....	898,500	104,398	259,037	19,804	407	114,443	804,411	100,655	69
1	3	32	2	222,812	13,965	850	122,766	128	60,795	3,000	3,343	70
.....	.....	2	.....	6,500	.....	4,010	1,140	5	2,154	21,521	.....	71
.....	1	31	.....	262,700	.....	.....	.....	50	14,846	.....	.....	72
.....	.....	13	.....	16,000	4,250	.....	.....	11	1,620	.....	6,968	73
.....	.....	4	.....	2,250	4,250	.....	.....	9	1,250	.....	6,968	74
.....	.....	9	.....	13,750	.....	.....	.....	2	370	.....	.....	75
.....	1	1,482	1	1,887,709	2,076,307	500	174,577	1,871	726,402	6,120	2,391,925	76
.....	.....	1,363	1	1,583,835	2,036,098	.....	13,179	1,582	588,672	.....	2,294,975	77
.....	1	119	.....	303,874	40,209	500	161,398	289	137,730	6,120	96,950	78
.....	11	478	3	1,292,570	588,776	164,996	422,353	1,259	440,770	1,042,837	1,213,874	79
.....	2	181	3	835,161	243,400	164,996	131,103	503	219,896	1,042,837	155,817	80
.....	.....	87	.....	383,237	185,038	129,333	11,160	321	122,137	735,073	141,017	81
.....	.....	35	2	138,652	53,642	5,663	101,566	150	63,220	7,764	5,600	82
.....	.....	3	.....	80,000	.....	30,000	.....	12	6,000	300,000	.....	83
.....	2	40	1	197,622	.....	.....	640	48	16,675	.....	.....	84
.....	.....	16	.....	35,650	4,720	.....	17,737	32	11,864	.....	9,200	85
.....	.....	1	.....	800	.....	.....	.....	.....	.....	.....	.....	86
.....	9	296	.....	456,609	345,376	.....	291,250	696	220,874	.....	1,058,057	87
.....	9	193	.....	237,987	290,228	.....	35,000	515	140,519	.....	733,189	88
.....	.....	103	.....	218,622	55,148	.....	256,250	181	80,355	.....	324,868	89

TABLE 65.—ALL VESSELS, BY CLASS, OWNERSHIP, AND DIVISION: 1906.

CLASS, OWNERSHIP, AND DIVISION.	Number of vessels.	Gross tonnage.	CONSTRUCTION.				Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.
			Iron.	Steel.	Wood.	Composite.					
Aggregate	37,321	12,893,429	531	1,448	35,247	95	$507,973,121	$294,854,532	140,929	$71,636,521	366,825,663
Individual	12,944	1,462,818	63	189	12,634	58	65,833,525	32,307,887	33,362	13,426,087	9,243,750
Firm	4,169	929,311	33	47	4,085	4	28,807,734	24,352,990	15,065	7,346,355	4,150,376
Incorporated company	19,729	10,375,681	411	1,168	18,121	29	402,419,557	233,480,197	89,481	48,290,500	332,042,567
Miscellaneous	479	125,619	24	44	407	4	10,912,305	4,713,458	3,021	2,573,579	21,379,970
Steam	9,927	4,059,521	485	1,189	8,197	56	396,772,727	225,547,789	95,452	50,504,508	366,322,769
Individual	4,359	316,219	54	169	4,104	32	40,280,220	14,735,851	16,909	7,479,091	9,078,347
Firm	1,141	145,326	28	40	1,072	1	9,990,927	10,468,009	6,235	3,393,402	4,136,946
Incorporated company	4,224	3,555,040	380	943	2,881	20	328,906,262	198,804,054	70,831	38,177,483	331,727,506
Miscellaneous	203	42,936	23	37	140	3	7,595,318	1,539,875	1,477	1,454,532	21,379,970
Sail	7,131	1,704,277	37	94	6,973	27	56,206,145	32,687,190	25,404	10,371,047	24,915
Individual	4,772	483,859	7	19	4,723	23	17,854,084	10,868,065	12,285	4,187,230	22,633
Firm	1,403	435,756	5	2	1,393	3	12,843,869	9,289,172	6,520	2,855,740	2,049
Incorporated company	857	729,784	24	66	767	.....	23,493,652	11,446,101	5,825	2,989,675	233
Miscellaneous	99	54,878	1	7	90	1	2,014,540	1,083,852	774	338,402	.....
Unrigged	20,263	7,129,631	9	165	20,077	12	64,994,249	36,619,553	20,073	10,760,966	477,979
Individual	3,813	662,740	2	1	3,807	3	7,699,221	6,703,971	4,168	1,759,766	142,770
Firm	1,625	348,229	.....	5	1,620	.....	5,972,938	4,595,809	2,310	1,097,213	20,381
Incorporated company	14,648	6,090,857	7	159	14,473	9	50,019,643	23,230,042	12,825	7,123,342	314,828
Miscellaneous	177	27,805	.....	.....	177	.....	1,302,447	2,089,731	770	780,645	.....
Atlantic coast and Gulf of Mexico	20,032	4,851,421	414	734	18,827	57	273,105,915	159,759,924	77,124	38,352,259	292,555,416
Individual	8,517	844,064	45	139	8,288	45	45,457,935	16,762,779	21,620	8,185,625	4,089,186
Firm	2,849	666,005	29	22	2,796	2	19,636,772	15,844,013	9,585	4,549,281	1,966,229
Incorporated company	8,341	3,246,215	317	540	7,475	9	199,516,774	123,137,403	43,740	23,642,205	286,278,832
Miscellaneous	325	95,137	23	33	268	1	8,494,434	4,015,729	2,179	1,975,148	20,201,169
Steam	5,413	1,457,894	385	608	4,388	32	193,926,327	115,444,487	45,388	24,433,617	292,292,820
Individual	2,625	130,963	37	121	2,446	21	27,444,680	5,933,069	9,732	4,305,969	[illegible]
Firm	580	48,015	25	21	533	1	4,588,052	5,453,014	2,726	[illegible]	1,984,184
Incorporated company	2,072	1,244,283	301	440	1,322	9	155,819,420	102,728,452	31,919	17,375,127	266,162,014
Miscellaneous	136	34,633	22	26	87	1	6,074,175	1,329,953	1,011	1,099,361	20,201,169
Sail	5,920	1,132,905	24	52	5,820	24	37,520,903	20,042,015	18,654	6,687,314	22,128
Individual	4,091	338,536	6	18	4,044	23	13,245,424	6,999,030	9,775	2,888,624	20,083
Firm	1,189	349,135	4	1	1,183	1	10,437,943	7,071,440	5,258	2,135,143	2,045
Incorporated company	558	399,761	13	26	519	.....	12,110,296	5,079,132	2,975	1,397,248	.....
Miscellaneous	82	45,473	1	7	74	.....	1,727,240	892,413	646	266,299	.....
Unrigged	8,699	2,260,622	5	74	8,619	1	41,658,685	24,273,422	13,082	7,231,328	240,468
Individual	1,801	374,565	2	.....	1,798	1	4,767,831	3,830,680	2,113	991,032	123,650
Firm	1,080	268,855	.....	.....	1,080	.....	4,610,777	3,319,559	1,601	750,978	.....
Incorporated company	5,711	1,602,171	3	74	5,634	.....	31,587,058	15,329,820	8,846	4,869,830	116,818
Miscellaneous	107	15,031	.....	.....	107	.....	693,019	1,793,363	522	619,488	.....
Pacific coast (including Alaska)	2,537	977,687	57	73	2,404	3	76,622,633	48,520,139	20,142	12,950,399	44,189,971
Individual	806	119,565	1	2	803	.....	6,585,265	4,923,697	3,022	1,876,325	917,552
Firm	275	73,131	2	2	271	.....	3,678,325	2,791,353	1,504	1,046,443	545,012
Incorporated company	1,404	770,404	54	69	1,279	2	65,235,015	40,297,220	15,233	9,765,577	41,571,407
Miscellaneous	52	14,587	.....	.....	51	1	1,124,028	507,869	383	262,054	1,156,000
Steam	1,066	518,107	42	63	959	2	60,440,145	37,287,470	14,423	9,330,294	44,187,184
Individual	320	23,015	1	2	317	.....	2,912,260	2,014,337	1,236	822,125	915,002
Firm	121	14,084	1	1	119	.....	1,599,400	1,304,923	698	510,006	545,008
Incorporated company	609	477,815	40	60	507	2	55,560,485	33,844,478	12,377	7,911,038	41,571,174
Miscellaneous	16	3,193	.....	.....	16	.....	368,000	123,732	112	87,125	1,156,000
Sail	666	305,283	12	8	645	1	11,533,171	8,299,751	4,481	2,719,571	2,787
Individual	366	85,227	.....	.....	366	.....	3,455,600	2,660,275	1,636	964,470	2,550
Firm	99	51,721	1	1	97	.....	1,934,565	1,333,530	748	496,254	4
Incorporated company	187	159,756	11	7	169	.....	5,866,206	4,134,060	1,978	1,192,927	233
Miscellaneous	14	8,579	.....	.....	13	1	276,800	171,886	119	65,920	.....
Unrigged	805	154,297	3	2	800	.....	4,649,317	2,932,918	1,238	900,534	.....
Individual	120	11,323	.....	.....	120	.....	217,405	249,085	150	89,730	.....
Firm	55	7,326	.....	.....	55	.....	144,300	152,900	58	40,183	.....
Incorporated company	608	132,833	3	2	603	.....	3,808,324	2,318,682	878	661,612	.....
Miscellaneous	22	2,815	.....	.....	22	.....	479,228	212,251	152	109,009	.....
Great Lakes and St. Lawrence river	2,990	2,392,863	33	539	2,391	27	130,805,640	65,274,702	24,916	13,280,716	14,080,146
Individual	975	204,175	12	32	922	9	8,355,470	5,170,969	3,572	1,642,942	1,333,019
Firm	429	132,836	2	15	410	2	4,025,536	4,052,492	2,386	1,131,976	592,956
Incorporated company	1,536	2,044,131	19	481	1,020	16	117,310,941	56,002,405	18,672	10,238,974	12,141,171
Miscellaneous	50	11,721	.....	11	39	.....	1,113,093	48,836	286	266,824	13,000
Steam	1,676	1,915,786	32	457	1,172	15	116,983,812	56,340,227	20,515	11,179,882	14,080,146
Individual	536	126,160	11	30	487	8	6,664,550	3,608,513	2,503	1,216,624	1,333,019
Firm	207	71,009	2	11	194	.....	2,813,500	2,446,025	1,534	737,711	592,956
Incorporated company	905	1,714,609	19	405	474	7	106,473,369	50,256,556	16,241	8,992,737	12,141,171
Miscellaneous	28	3,948	.....	11	17	.....	1,032,393	29,133	237	232,810	13,000
Sail	531	265,571	1	34	494	2	7,135,271	4,341,174	2,258	962,542	.....
Individual	301	59,578	1	1	299	.....	1,136,260	1,204,510	863	332,516	.....
Firm	115	34,900	.....	.....	113	2	471,361	884,202	514	224,343	.....
Incorporated company	112	170,267	.....	33	79	.....	5,517,150	2,232,909	872	399,500	.....
Miscellaneous	3	826	.....	.....	3	.....	10,500	19,553	9	6,183	.....
Unrigged	783	211,506	.....	48	725	10	6,686,557	4,593,301	2,143	1,138,292	.....
Individual	138	18,437	.....	1	136	1	554,660	357,946	206	93,802	.....
Firm	107	26,927	.....	4	103	.....	740,675	722,265	338	169,922	.....
Incorporated company	519	159,195	.....	43	467	9	5,320,422	3,512,940	1,559	846,737	.....
Miscellaneous	19	6,947	.....	.....	19	.....	70,800	150	40	27,831	.....

TABLE 65.—ALL VESSELS, BY CLASS, OWNERSHIP, AND DIVISION: 1906—Continued.

CLASS, OWNERSHIP, AND DIVISION.	Number of vessels.	Gross tonnage.	CONSTRUCTION.				Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.
			Iron.	Steel.	Wood.	Composite.					
Mississippi river and its tributaries	9,622	4,411,967	26	81	9,513	2	$22,852,142	$17,342,038	15,016	$5,692,117	14,122,241
Individual	1,318	134,655	5	13	1,300	.....	3,114,755	3,166,478	3,132	1,038,563	2,593,811
Firm	533	49,346	.....	8	525	.....	1,341,901	1,527,247	1,403	564,360	974,054
Incorporated company	7,752	4,226,600	20	60	7,670	2	18,292,186	12,598,664	10,403	4,059,646	10,549,328
Miscellaneous	19	1,366	1	.....	18	.....	103,300	49,649	78	29,548	5,048
Steam	1,435	146,227	25	50	1,358	2	13,196,770	15,410,136	13,973	5,148,581	13,890,850
Individual	687	27,524	5	13	669	.....	2,394,680	2,852,034	2,942	962,389	2,580,811
Firm	211	11,360	.....	7	204	.....	935,875	1,217,607	1,210	465,025	953,673
Incorporated company	524	106,575	19	30	473	2	9,783,915	11,296,846	9,743	3,691,619	10,351,318
Miscellaneous	13	768	1	.....	12	.....	82,300	43,649	78	29,548	5,048
Unrigged	8,187	4,265,740	1	31	8,155	.....	9,655,372	1,931,902	1,043	543,536	231,391
Individual	631	107,131	.....	.....	631	.....	720,075	314,444	190	76,174	13,000
Firm	322	37,986	.....	1	321	.....	406,026	309,640	193	99,335	20,381
Incorporated company	7,228	4,120,025	1	30	7,197	.....	8,508,271	1,301,818	660	368,027	198,010
Miscellaneous	6	598	.....	.....	6	.....	21,000	6,000	.....	.....	.....
Canals and other inland waters of New York state	1,648	209,152	1	10	1,634	3	3,294,221	2,781,604	2,472	920,260	835,052
Individual	1,152	143,428	.....	1	1,150	1	1,755,585	1,828,375	1,617	535,678	160,373
Firm	44	4,554	.....	.....	44	.....	54,600	49,936	76	18,671	27,886
Incorporated company	429	59,168	1	9	419	.....	1,428,836	877,826	727	345,573	646,793
Miscellaneous	23	2,002	.....	.....	21	2	55,200	25,467	52	20,338	.....
Steam	151	14,127	1	9	139	2	1,390,512	525,970	590	192,238	828,932
Individual	89	5,056	.....	1	88	.....	467,400	154,141	263	89,472	154,253
Firm	7	182	.....	.....	7	.....	14,000	10,527	14	2,931	27,886
Incorporated company	49	8,572	1	8	40	.....	881,112	359,302	291	91,622	646,793
Miscellaneous	6	317	.....	.....	4	2	28,000	2,000	22	8,213	.....
Sail:											
Individual	13	495	.....	.....	13	.....	16,000	4,250	11	1,620	.....
Unrigged	1,484	194,530	.....	1	1,482	1	1,887,709	2,251,384	1,871	726,402	6,120
Individual	1,050	137,877	.....	.....	1,049	1	1,272,185	1,669,984	1,343	444,586	6,120
Firm	37	4,372	.....	.....	37	.....	40,600	39,409	62	15,740	.....
Incorporated company	380	50,596	.....	1	379	.....	547,724	518,524	436	253,951	.....
Miscellaneous	17	1,685	.....	.....	17	.....	27,200	23,467	30	12,125	.....
All other inland waters	492	50,339	.....	11	478	3	1,292,570	1,176,125	1,259	440,770	1,042,837
Individual	176	16,931	.....	2	171	3	564,515	455,589	399	146,954	149,809
Firm	39	3,439	.....	.....	39	.....	70,600	87,949	111	35,624	33,239
Incorporated company	267	29,163	.....	9	258	.....	635,805	566,679	706	238,525	855,036
Miscellaneous	10	806	.....	.....	10	.....	21,650	65,908	43	19,667	4,753
Steam	186	7,380	.....	2	181	3	835,161	539,499	563	219,896	1,042,837
Individual	102	3,501	.....	2	97	3	396,650	173,757	233	82,512	149,809
Firm	15	676	.....	.....	15	.....	40,100	35,913	53	14,569	33,239
Incorporated company	65	3,126	.....	.....	65	.....	387,961	318,421	260	115,340	855,036
Miscellaneous	4	77	.....	.....	4	.....	10,450	11,408	17	7,475	4,753
Sail:											
Individual	1	23	.....	.....	1	.....	800	.....	.....	.....	.....
Unrigged	305	42,936	.....	9	296	.....	456,609	636,626	696	220,874	.....
Individual	73	13,407	.....	.....	73	.....	167,065	281,832	166	64,442	.....
Firm	24	2,763	.....	.....	24	.....	30,500	52,036	58	21,055	.....
Incorporated company	202	26,037	.....	9	193	.....	247,844	248,258	446	123,185	.....
Miscellaneous	6	729	.....	.....	6	.....	11,200	54,500	26	12,192	.....

ATLANTIC COAST AND GULF OF MEXICO

ATLANTIC COAST AND GULF OF MEXICO.

By EMORY R. JOHNSON.

This section of the report is concerned primarily with the vessels employed and the traffic carried on in the coastwise commerce of the Atlantic and Gulf seaboard. The discussion of the vessels is supplemented by an account of the men employed ashore and afloat to conduct the commerce and man the marine. To make more nearly complete the picture of the commercial activities of the ports of the Atlantic and Gulf coasts, the detailed data regarding the coastwise traffic are followed by brief tables of the foreign trade in imports and exports handled through those gateways, and of the entrances and clearances of the vessels required for the transportation of that part of our foreign commerce. And lastly, to show what the United States has done to aid the domestic and foreign trade of the Atlantic and Gulf ports, a full statement is made of the appropriations that have been granted by Congress, from the beginning up to 1907, for the improvement of the channels and harbors of each port.

The scope of this census and the extent to which comparisons may be made with previous censuses have been fully considered in the United States section of this report, and need not be further discussed. It being the general plan of the Bureau of the Census not to duplicate the work of other Government bureaus, a limited number of the tables here presented have been compiled from the annual reports of the Bureau of Navigation and the Bureau of Statistics of the Department of Commerce and Labor, and from the reports of the Chief of Engineers of the United States Army. Credit is given to the appropriate bureau or department for all data taken, and for each table compiled, from any source other than the returns made to the Bureau of the Census.

USES OF WORDS "TON" AND "TONNAGE."

In the following tables and in the discussion of them the word *tonnage* is used frequently, and of necessity with different meanings. Usually the capacity of vessels is expressed in gross tonnage; a few references, however, are made to net tonnage. It will be understood that the gross register tonnage of a vessel is obtained by dividing the number of cubic feet in the capacity of the ship by 100, since a vessel has one gross ton for each 100 cubic feet capacity. The net register tonnage is obtained by dividing by 100 the capacity in cubic feet of the space available for cargo and passengers, this space being found by deducting from the entire capacity of the ship the space occupied by machinery, by accommodations for the crew, and by certain other housings which are carefully designated by law.

Freight rates for a part of our coastwise commerce are based upon quantity units, such as barrels, bushels, and bales, and not upon the hundredweight or ton. The practice that obtains in the billing of coastwise shipments is explained by an agent of one of the largest coastwise steamship companies as follows: "Freight charges on coastwise traffic are not always based on the 100-pound basis. There are cases where the freight rates are on a per ton basis; for instance, pig iron, steel rails, and similar traffic. On pig iron, steel rails, coal, and most other commodities of like nature the freight rate per ton is based on 2,240 pounds. There are some few exceptions; for instance, in the rates on clay, where a ton of 2,000 pounds is understood to apply. There are other cases where freight rates are based on so much per package; for instance, oil in barrels, fruit and vegetables, etc. Then in the case of lumber, freight rates are based on so much per 1,000 feet. Aside from such cases as these, of course the general basis is per 100 pounds, this basis applying on almost everything which is usually classed under the head of general merchandise."

In our foreign maritime commerce the weight ton commonly used is the long ton of 2,240 pounds; although charges are frequently based upon the ton of 40 cubic feet of space. In this respect foreign maritime commerce differs from traffic upon our railroads and inland waterways, where the net ton of 2,000 pounds prevails, except in the case of shipments

of anthracite coal from the mines to the Atlantic seaboard; and differs somewhat also from the coastwise trade, where the weight ton of 2,000 pounds, as has just been stated, is sometimes employed. In order that comparisons may be made between our maritime and domestic commerce, the commerce handled coastwise has been expressed in net tons of 2,000 pounds.

AMERICAN FLEET ON THE ATLANTIC AND GULF COASTS.

The main facts regarding American vessels employed in the coastwise and foreign commerce of the Atlantic and Gulf coasts of the United States are presented in a summary form in Table 1, which includes data for the years 1889 and 1906, for all classes of craft of 5 tons net register or over.

TABLE 1.—ALL VESSELS AND CRAFT: 1906 AND 1889.

[Vessels operating as connecting links in railroad systems did not uniformly report the tonnage of freight carried or income for the year. In addition to the craft reported in this table there were 1,074 vessels, with a gross tonnage of 87,254, reported as idle in 1906, and 1,228, with a gross tonnage of 204,185, reported as idle or untraceable in 1889.]

	TOTAL.			STEAM.[1]			SAIL.[2]			UNRIGGED.		
	1906	1889[3]	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels	20,032	12,238	63.7	5,413	2,536	113.4	5,920	6,277	[4]5.7	8,699	3,425	154.0
Gross tonnage	4,851,421	2,658,445	82.5	1,457,894	741,770	96.5	1,132,905	1,293,192	[4]12.4	2,260,622	623,483	262.6
Value of vessels	$273,105,915	$116,042,062	135.4	$193,926,327	$65,518,640	196.0	$37,520,903	$42,685,982	[4]12.1	$41,658,685	$7,837,440	431.5
Gross income	$159,759,924	$90,147,632	77.2	$139,717,909	$57,034,216	145.0	$20,042,015	$33,113,416	[4]39.5	([5])	([5])	.....
Number of employees	77,124	[6]63,625	21.2	58,470	[6]30,528	91.5	18,654	[6]33,097	[4]43.6	([5])	([5])	.....
Wages	$38,352,259	[6]$22,123,099	73.4	$31,664,945	[6]$13,284,325	138.4	$6,687,314	[6]$8,838,774	[4]24.3	([5])	([5])	.....
Number of passengers carried	292,555,416	170,225,458	71.9	292,533,288	170,225,458	71.9	22,128	.....	.....	([5])	([5])	.....
Freight carried, including harbor work (net tons)	140,512,043	52,712,124	166.6	121,502,757	([7])	.....	19,009,286	([7])	.....	([5])	([7])	.....

[1] Includes all craft propelled by machinery.
[2] Includes schooner barges, scow schooners, etc.
[3] Includes 52 craft, with a gross tonnage of 2,553, valued at $75,300, for which no report was made for income, employees, wages, number of passengers and freight carried.
[4] Decrease.
[5] Included in statistics for steam vessels.
[6] Does not include employees or wages for yachts.
[7] Not reported separately.

DIAGRAM 1.—*Relative amount of tonnage of metal and wooden vessels: 1875 to 1906.*

[Based on data in reports of the Commissioner of Navigation which include statistics of fishing vessels, omitted by the Census.]

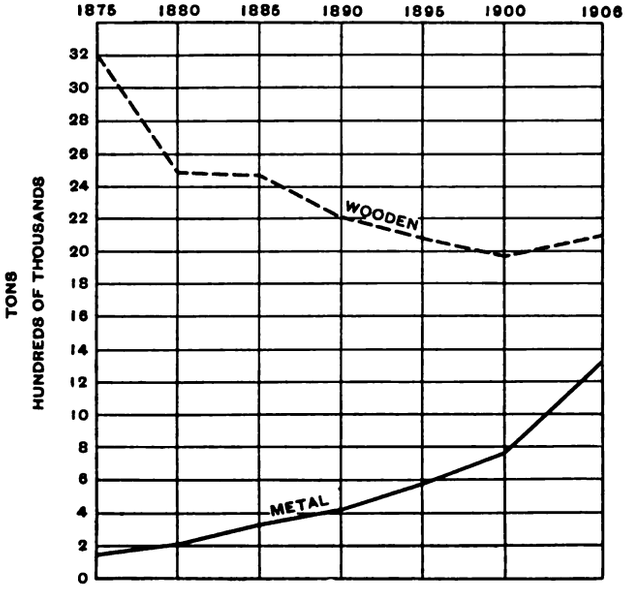
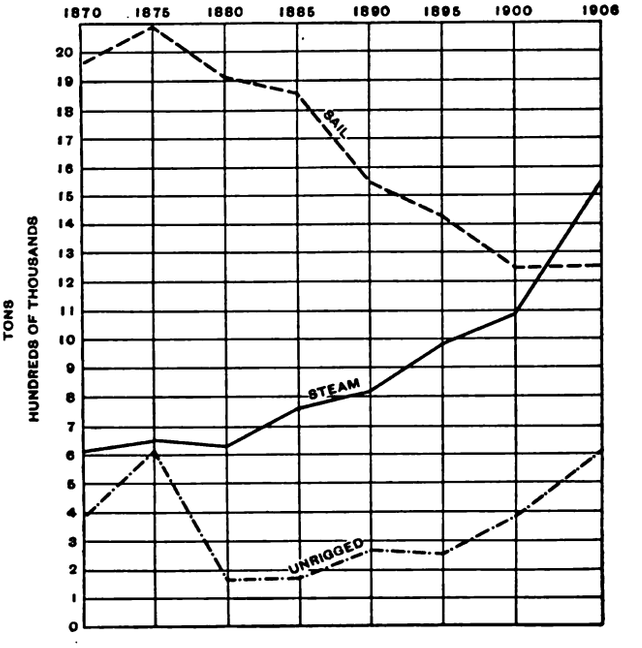


DIAGRAM 2.—*Relative amount of tonnage, steam, sail, and unrigged vessels: 1870 to 1906.*

[Based on data in reports of the Commissioner of Navigation which include statistics of fishing vessels, omitted by the Census.]



The number of sailing vessels in 1906 exceeded the number of steam craft, in spite of the fact that the number of steam vessels more than doubled between 1889 and 1906, and the number of sailing vessels decreased 5.7 per cent. Over two-fifths of the total number of vessels in operation from ports on these coasts consisted of unrigged craft, a fact that is highly significant, inasmuch as it shows the large use made of lighters in harbor work and barges in coastwise traffic. The tonnage of the unrigged craft was nearly one-half of the total gross tonnage of the entire fleet of the Atlantic and Gulf coasts.

The value of the vessels operated from the Atlantic and Gulf ports increased 135.4 per cent from 1889 to 1906; but the gain was in the steamships and unrigged craft, the most rapid growth being in the latter class of shipping. The sailing vessels were valued at 12.1 per cent less in 1906 than they were in 1889.

Most of the vessels, whether steam, sail, or unrigged craft, are still of wood construction. Less than one-fifth of the steam vessels were made of iron, steel, or "composite" construction. It is a well-known fact, however, that steel is rapidly displacing wood as material for the construction of steamships. Steel is also being used to some extent in building sailing vessels, as is shown by the reports of the Commissioner of Navigation, there having been four relatively large sailing vessels constructed of steel in 1906, and the same number in 1907.

The annual reports of the Commissioner of Navigation state the number and tonnage of all documented vessels, in order to show the progress of the merchant marine. The number and tonnage of the documented vessels of the Atlantic and Gulf coasts are shown in Table 2, for each year from 1889 to 1906.

TABLE 2.—NUMBER AND GROSS TONNAGE OF REGISTERED, ENROLLED, AND LICENSED SAIL AND STEAM VESSELS CONSTITUTING THE TOTAL MERCHANT MARINE OF THE ATLANTIC COAST AND GULF OF MEXICO, INCLUDING FISHING VESSELS: 1889 TO 1906.[1]

YEAR	TOTAL MERCHANT MARINE.						
	Total.			Sail.[2]		Steam.	
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	17,477	3,427,046	0.9	12,628	1,868,395	4,849	1,558,651
1905	17,357	3,396,452	4.7	12,935	1,869,091	4,422	1,527,361
1904	17,330	3,244,928	3.0	13,184	1,803,278	4,146	1,441,650
1903	17,218	3,149,711	5.7	13,305	1,767,003	3,913	1,382,708
1902	17,040	2,978,876	4.5	13,332	1,710,835	3,708	1,268,041
1901	16,744	2,849,342	4.4	13,200	1,674,030	3,544	1,175,312
1900	16,532	2,727,892	4.3	13,170	1,640,260	3,362	1,087,632
1899	16,275	2,614,869	2.4	13,028	1,592,174	3,247	1,022,695
1898	16,442	2,553,739	[4]3.6	13,256	1,580,479	3,186	973,260
1897	16,592	2,647,796	[4]0.7	13,419	1,636,694	3,173	1,011,102
1896	16,786	2,667,314	[4]0.5	13,612	1,656,445	3,174	1,010,869
1895	17,136	2,679,779	[4]1.2	13,972	1,699,717	3,164	980,062
1894	17,468	2,712,944	[4]3.4	14,342	1,754,102	3,126	958,842
1893	17,913	2,807,690	0.1	14,800	1,853,436	3,113	954,254
1892	17,891	2,805,916	0.9	14,852	1,904,029	3,039	901,887
1891	17,564	2,780,683	5.4	14,629	1,894,308	2,935	886,375
1890	17,332	2,638,596	1.5	14,532	1,821,488	2,800	817,108
1889	17,572	2,599,504	.....	14,743	1,800,595	2,829	798,909

YEAR.	ENROLLED AND LICENSED VESSELS, UNDER 20 TONS.							REGISTERED VESSELS.						
	Total.			Sail.[2]		Steam.		Total.			Sail.[3]		Steam.	
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	16,912	2,823,909	2.2	12,216	1,691,506	4,696	1,132,403	565	603,137	[4]4.7	412	176,889	153	426,248
1905	16,763	2,763,866	3.4	12,500	1,670,105	4,263	1,093,761	594	632,586	10.6	435	198,986	159	433,600
1904	16,756	2,672,794	3.2	12,764	1,619,438	3,992	1,053,356	574	572,134	2.4	420	183,840	154	388,294
1903	16,603	2,591,118	6.2	12,850	1,571,074	3,753	1,020,044	615	558,593	3.5	455	195,929	160	362,664
1902	16,332	2,439,415	7.4	12,774	1,465,338	3,558	974,077	708	539,461	[4]6.7	558	245,497	150	293,964
1901	15,938	2,270,938	3.7	12,557	1,370,025	3,381	900,913	806	578,404	7.6	643	304,005	163	274,399
1900	15,742	2,190,552	6.5	12,516	1,323,958	3,226	866,594	790	537,340	[4]3.6	654	316,302	136	221,038
1899	15,488	2,057,485	[4]0.4	12,378	1,262,521	3,110	794,964	787	557,384	14.2	650	329,653	137	227,731
1898	15,770	2,065,611	1.5	12,693	1,277,946	3,077	787,665	672	488,128	[4]20.4	563	302,533	109	185,595
1897	15,739	2,034,886	0.9	12,678	1,219,752	3,061	815,134	853	612,910	[4]5.9	741	416,942	112	195,968
1896	15,905	2,016,020	[4]0.8	12,846	1,209,682	3,059	806,338	881	651,294	0.8	766	446,763	115	204,531
1895	16,247	2,033,367	1.3	13,190	1,240,148	3,057	793,219	889	646,412	[4]8.4	782	459,569	107	186,843
1894	16,501	2,007,588	[4]4.5	13,488	1,249,837	3,013	757,751	967	705,356	(5)	854	504,264	113	201,092
1893	16,928	2,102,269	3.9	13,933	1,338,368	2,995	763,901	985	705,421	[4]9.8	867	515,068	118	190,353
1892	16,747	2,024,182	1.3	13,814	1,279,177	2,933	745,005	1,144	781,734	(5)	1,038	624,832	106	156,882
1891	16,397	1,999,028	4.3	13,575	1,276,588	2,822	722,440	1,167	781,655	8.3	1,054	617,721	113	163,934
1890	16,214	1,917,041	7.3	13,504	1,226,208	2,710	690,833	1,118	721,555	[4]11.3	1,028	595,279	90	126,276
1889	16,261	1,786,065	.....	13,522	1,112,649	2,739	673,416	1,311	813,439	.....	1,221	687,946	90	125,493

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.
[2] Including canal boats and barges.
[3] Including barges.
[4] Decrease.
[5] Less than one-tenth of 1 per cent.

The census data include various classes of vessels, particularly undocumented craft, not comprised in the compilation made by the Bureau of Navigation.[1] The table taken from the report of the Commissioner of Navigation shows that the progress of the marine of the Atlantic and Gulf coasts was seriously checked from 1894 to 1898 by the business depression during those years. The lowest tonnage for the eighteen-year period was reported for 1898, and it was not until 1900 that the position reached in 1894 had been regained. As a rule, the progress since 1900 has been more rapid than during any other part of the eighteen-year period.

It is hardly necessary to state that the increase in tonnage has been mainly in steamships, and that there has been very little growth in the tonnage of sailing vessels. Indeed, sailing vessels were fewer in number and less in total tonnage in 1906 than in 1892, the year in which they reached their maximum. The progress of the merchant marine of the Atlantic and Gulf coasts has been in the vessels employed in domestic commerce—that is, in the enrolled and licensed tonnage. The vessels engaged in foreign trade—the registered vessels—numbered 1,311 and had a gross tonnage of 813,439 in 1889; in 1906 the number of such vessels was 565 and the tonnage 603,137. The lowest figure for registered tonnage was reached in 1898, when the total was only 488,128. The tonnage of steamers engaged in the foreign trade increased from 125,493 in 1889 to 426,248 in 1906, while the registered tonnage of sailing vessels fell from 687,946 to 176,889. The Census reports show that 489 American vessels, with a gross tonnage of 538,082 and a value of $52,329,924, carried freight between our Atlantic and Gulf coasts and foreign countries during the year 1906.

In Table 3 the vessels in the fleet of the Atlantic and Gulf coasts are classified with reference to their services.

[1] See United States section of this report, page 6.

TABLE 3.—ALL VESSELS AND CRAFT, BY OCCUPATION, AND PER CENT IN EACH GROUP: 1906.

OCCUPATION.	VESSELS.		TONNAGE.		VALUE OF VESSELS.		GROSS INCOME.		EMPLOYEES.		WAGES.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Number.	Per cent.	Amount.	Per cent.
Total	20,032	100.0	4,851,421	100.0	$273,105,915	100.0	$159,759,924	100.0	77,124	100.0	$38,352,259	100.0
Commercial vessels	16,409	81.9	4,724,160	97.4	241,874,036	88.6	157,396,518	98.5	68,297	88.6	34,647,943	90.3
Freight and passenger	5,750	28.7	2,151,712	44.4	154,350,334	56.5	92,096,988	57.6	41,551	53.9	17,789,511	46.4
Ferryboats	270	1.3	162,834	3.4	19,970,466	7.3	10,571,534	6.6	2,388	3.1	2,098,540	5.5
Tugs and other towing vessels	1,690	8.4	148,992	3.1	25,894,551	9.5	30,454,574	19.1	11,276	14.6	7,528,564	19.6
Unrigged craft	8,699	43.4	2,260,622	46.6	41,658,685	15.3	24,273,422	15.2	13,082	17.0	7,231,328	18.9
Yachts	2,935	14.7	91,507	1.9	25,066,082	9.2	18,721	(1)	6,923	9.0	2,541,310	6.6
All other	688	3.4	35,754	0.7	6,165,797	2.3	2,344,685	1.5	1,904	2.5	1,163,006	3.0

[1] Less than one-tenth of 1 per cent.

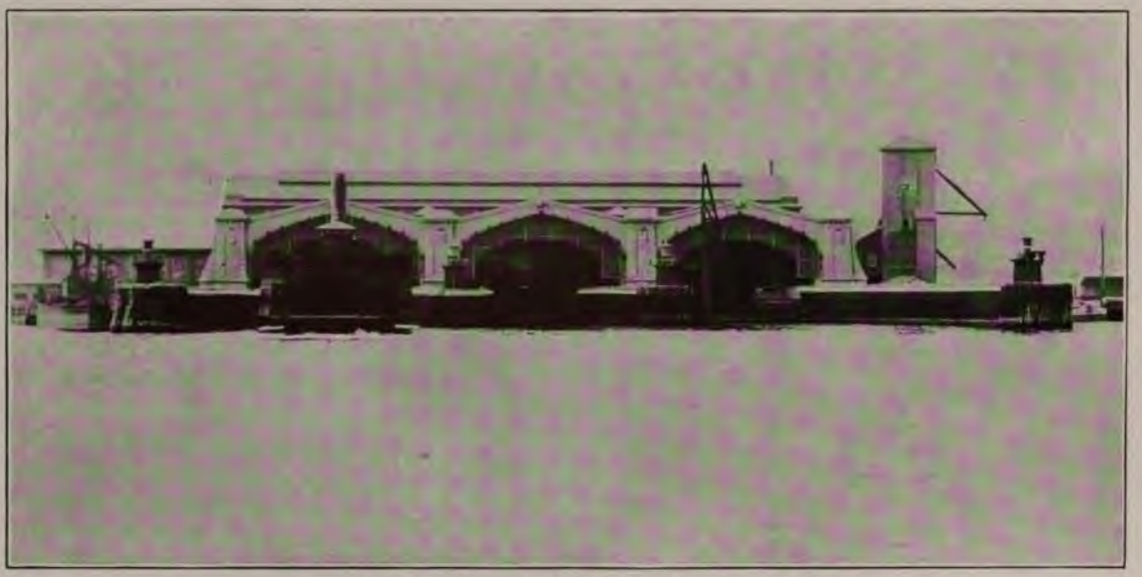
Probably the most significant economic fact shown is the extensive use of the unrigged craft, which constituted over one-half of the total number of commercial vessels and comprised nearly one-half of the entire tonnage of these vessels. Inasmuch as most tugs are employed a larger part of the time in towing unrigged craft, the totals for the two classes of vessels may be taken as representing the craft used in barge traffic and in lighterage work. The tugs and unrigged craft together constitute over one-half of all the vessels of the fleet of the Atlantic and Gulf coasts, and their tonnage makes up nearly one-half of the total tonnage of the fleet. Although they comprise less than one-fourth of the total value of the fleet, their earnings amounted to over one-third of the total gross income. The importance of ferriage at the Atlantic and Gulf ports is also shown by the table. The number and value of yachts are likewise significant, the use of such vessels being for the purposes of business and pleasure.

About two-fifths of the 20,032 vessels of all classes of 5 tons or over operated on the Atlantic and Gulf coasts consisted of undocumented craft.

TABLE 4.—*Number and gross tonnage of active and idle undocumented craft: 1906.*

CLASS.	Number of vessels.	Gross tonnage.
Total	8,065	1,831,023
Active	7,880	1,813,052
Steam	659	28,042
Sail	404	3,783
Unrigged	6,817	1,781,227
Idle	185	17,971
Steam	71	5,003
Sail	27	248
Unrigged	87	12,720

The gross tonnage of this undocumented shipping amounted to 1,831,023, all but 37,076 tons of which was credited to the unrigged craft, consisting mainly of barges and lighters. All but a small portion of this large tonnage was in use in 1906, during which year the shipping business was regularly active.



MUNICIPAL FERRY TERMINAL, ST. GEORGE, STATEN ISLAND, N. Y.

BARGE PHOENIX OF THE PHILADELPHIA AND READING COAL AND IRON COMPANY'S FLEET.

Tables 5 to 10 give the details regarding each of the different classes of vessels included in the fleet of the Atlantic and Gulf coasts. The steam vessels of this fleet numbered 5,413, with a gross tonnage of nearly 1,500,000, and their value approximated $200,000,000. The steamships used in the transportation of freight and passengers comprised only 28.1 per cent of the total, the towing vessels and also the yachts outnumbering the freight and passenger steamers.

TABLE 5.—*Steam vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	5,413	100.0	1,457,894	100.0	$193,926,327	100.0
Freight and passenger	1,523	28.1	1,045,811	71.7	121,136,485	62.5
Tugs and other towing vessels	1,690	31.2	148,992	10.2	25,894,551	13.4
Ferryboats	270	5.0	162,834	11.2	19,970,466	10.3
Yachts	1,577	29.1	70,461	4.8	21,290,339	11.0
All other	353	6.5	29,796	2.0	5,634,486	2.9

As would be expected, the freight and passenger steamers were on an average much larger than the other classes of steam craft, the gross tonnage of the steamships employed in the freight and passenger service being 71.7 per cent of the total gross tonnage of the entire fleet. Their value was 62.5 per cent of the total.

A small number of canal boats is included among the unrigged craft of the Atlantic and Gulf coasts. It is natural, however, that the larger part of the canal boats should be included among the vessels employed upon the inland waterways of the United States, the unrigged craft of the Atlantic and Gulf coasts being mainly the barges and lighters built for operation on salt water.

TABLE 6.—*Unrigged vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	8,699	100.0	2,260,622	100.0	$41,658,685	100.0
Canal boats	663	7.6	103,877	4.6	1,112,475	2.7
All other	8,036	92.4	2,156,745	95.4	40,546,210	97.3

The sailing vessels of the Atlantic and Gulf coasts outnumbered the steamers but comprised a smaller gross tonnage, while their value was only 19.3 per cent of the value of the steamships. As would be expected, a large number of yachts are included with the sailing vessels; they constituted 22.9 per cent of the total, as is shown in Table 7. While their gross tonnage was small, forming only 1.9 per cent of the total, their value was relatively high, being 10.1 per cent of the total.

TABLE 7.—*Sail vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	5,920	100.0	1,132,905	100.0	$37,520,903	100.0
Freight and passenger	4,227	71.4	1,105,901	97.6	33,213,849	88.5
Yachts	1,358	22.9	21,046	1.9	3,775,743	10.1
All other	335	5.7	5,958	0.5	531,311	1.4

The figures for sailing vessels include schooner barges, which are craft usually towed, but equipped with schooner-rigged masts, so that they may be able to take care of themselves in case they break adrift from the tugs towing them.[1] Of the 515 vessels classified as schooner barges, in the United States as a whole, 389 were on the Atlantic and Gulf coasts, and their tonnage was nearly two-thirds of the total gross tonnage of all such vessels in the United States. These schooner barges are used extensively in the coastwise transportation of coal. The practice still continues of converting old sailing vessels into schooner barges, but the plan is also followed of constructing new schooner barges either with wood or steel hulls.

TABLE 8.—*Schooner barges: 1906.*

Number of vessels	389
Gross tonnage	323,618
Value of vessels	$7,497,833
Number of employees	1,458
Wages	$721,911

FERRYBOATS.

Details regarding the ferryboats used at and about the ports of the Atlantic coast and the Gulf of Mexico are shown in Table 9.

[1] See United States section of this report, page 10.

TABLE 9.—FERRYBOATS, BY DISTRICTS, WITH PER CENT IN EACH DISTRICT: 1906.

DISTRICT.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.
Total	270	162,834	$19,970,466	$10,571,534	2,388	$2,098,540	272,596,670
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
New York	152	129,690	17,098,677	8,423,119	1,622	1,578,839	208,684,123
Per cent of total	56.3	79.6	85.6	79.7	67.9	75.2	76.6
Philadelphia	25	10,306	918,867	1,009,295	217	195,560	30,616,853
Per cent of total	9.3	6.3	4.6	9.5	9.1	9.3	11.2
All other districts	93	22,838	1,952,922	1,139,120	549	324,141	33,295,694
Per cent of total	34.4	14.0	9.8	10.8	23.0	15.4	12.2

The 270 ferryboats in use in 1906 had a total value of nearly $20,000,000, and their gross income was $10,500,000. Almost three-fifths of these boats were used in the waterways about New York city. The ferry service on the Delaware river between Philadelphia and Camden required only one-sixth as many boats as were needed at New York city. Moreover, the ferryboats in operation about New York city were above the average in size and greatly exceeded the average in value. The ferryboats used at New York and Philadelphia numbered 177, while there were 93 employed at all the other ports on the Atlantic and Gulf coasts. In addition to these, 11 ferries were operated on the Mississippi river at New Orleans, and the statistics for them are included in the section on the Mississippi river and its tributaries. The figures for ferryboats do not include car floats moved about harbors by tugs.

The number of passengers carried on ferryboats would naturally be large; indeed the 272,596,670 passengers reported for the ferry traffic formed 93.2 per cent of the total number of passengers carried on all vessels of the fleet of the Atlantic and Gulf coasts. Moreover, the ferryboat traffic on the Atlantic and Gulf coasts was credited with 74.3 per cent of the total number of passengers carried on all kinds of vessels in the entire United States. Over one-half (56.9 per cent) of all the passengers carried in the United States was reported for the ferry traffic on the waters about New York city; and, although New York is the great center of American coastwise traffic, the number of ferry passengers at that port is many times the number of other passengers. At Philadelphia, the next most important center of the ferry traffic on the Atlantic coast, about 30,000,000 passengers were carried, as contrasted with over 208,000,000 at New York and with about 33,000,000 in all other districts of the Atlantic and Gulf coasts.

The increase in the tonnage and traffic of ferryboats from 1889 to 1906 is shown in Table 10.

TABLE 10.—*Ferryboats, with per cent of increase: 1906 and 1889.*

	1906	1889	Per cent of increase.
Number of vessels	270	214	26.2
Gross tonnage	162,834	98,174	65.9
Value of vessels	$19,970,466	$7,907,700	152.5
Gross income	$10,571,534	$5,392,969	96.0
Passengers	$7,386,913	(1)	.....
All other sources	$3,184,621	(1)	.....
Number of employees	2,388	1,710	39.6
Wages	$2,098,540	$1,276,847	64.4
Number of passengers carried	272,596,670	158,644,012	71.8

[1] Not reported separately.

It will be noted that the ferryboats now being built are larger than their predecessors, since there was a gain of 26.2 per cent in the number of ferry vessels, and that increase accounted for a growth of about 66 per cent in the gross tonnage. The rise in value is even more striking, the gain having been 152.5 per cent. The income from ferry traffic about doubled, and the number of passengers carried increased 71.8 per cent.

The extent to which ferries were operated by municipal governments is shown in Table 11.

TABLE 11.—MUNICIPAL FERRIES: 1906.

DISTRICT.	Number of vessels.	Gross tonnage.	Value of vessels.	GROSS INCOME.		Number of employees.	Wages.	Number of passengers carried.
				Passengers.	All other sources.			
Total	25	19,337	$2,466,447	$620,780	$263,172	264	$433,029	19,784,055
New York harbor	16	14,829	2,253,000	557,437	220,905	188	360,159	12,521,847
Boston harbor	7	4,448	209,347	62,373	41,037	72	70,720	7,242,808
Small points on Connecticut river	2	60	4,100	970	1,230	4	2,150	19,400

At the ports of the Atlantic coast and Gulf of Mexico there were 25 municipal ferryboats out of a total of 29 for the entire country. Sixteen of the 25 were at New York; 7, at Boston; and 2, on the Connecticut river. New York and Boston are the only cities on the Atlantic and Gulf coasts that have found it necessary or desirable to operate ferryboats. Of the 16 municipal ferries reported for New York harbor, 7 were used in connection with the management of penal or charitable institutions. The number of passengers carried on the New York municipal ferries was relatively small. These 16 municipal ferryboats operated in 1906 were but 10.5 per cent of the total of 152 ferryboats in use at New York, and the 12,521,847 passengers which they carried comprised only 6 per cent of the total ferry traffic of New York harbor. This condition is probably explained by the fact that municipal ferries are developing new services which may be expected to increase with the consequent redistribution of population.

RAILWAY SHIPPING.

Information regarding the vessels used by steam railroads is presented in Table 12.

TABLE 12.—*Craft operated in connection with steam railroads: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels	1,324	206	1,118
Gross tonnage	472,917	34,664	438,253
Value of vessels	$12,436,261	$4,670,207	$7,766,054
Number of employees	3,582	2,147	1,435
Wages	$2,493,845	$1,554,433	$939,412
Number of passengers carried	697,127	597,127	100,000

Of the total number of craft thus employed on the Atlantic coast and Gulf of Mexico, 206 were operated by their own engines, and 1,118 were unrigged craft. This shipping operated in connection with steam railroads includes the "craft engaged in the transportation of freight and passengers, or freight and passenger cars as connecting links in railway systems exclusively, freight vessels operated for the purpose of extending freight business from railroad terminals to adjacent ports without additional charge, vessels used in connection with construction work for railroad companies, and craft owned by the companies and engaged in lightering the freight incident to the operation of the road." [1] The figures in Table 12 do not include vessels operated by railroad companies as regular freight and passenger lines, or the enormous railroad ferry traffic at New York and Philadelphia. Nine-tenths of the 1,464 vessels operated in 1906 in connection with steam railroads in the entire United States were used on the Atlantic and Gulf coasts.

GOVERNMENT VESSELS.

While this report does not include the statistics of vessels owned by the United States Government, it contains the facts regarding the vessels owned and operated by state and city governments.

TABLE 13.—*Vessels owned and operated by state and city governments: 1906.*

	Total.	Steam.	Sail.	Unrigged.
Number of vessels	213	104	3	106
Gross tonnage	46,264	31,228	78	14,958
Value of vessels	$6,169,775	$5,470,975	$6,380	$692,420
Gross income	[1] $2,924,807	$1,131,594	.....	[1] $1,793,213
Number of employees	1,369	839	8	522
Wages	$1,632,858	$1,008,090	$5,280	$619,488
Number of passengers carried	20,183,209	20,183,209	.....	.....

[1] Includes value of work done by craft of the Department of Docks and Ferries, New York city.

Table 13 includes "municipal ferryboats, fire boats, police patrol boats, oyster patrol boats, scavenger and garbage boats, quarantine boats, ambulance boats, boats for the protection of fish and game, canal inspection and repair boats, dredges and dredge tenders, steam derricks, pilot boats, pile drivers, ice boats, ice breakers, boats used for scientific investigation, and those used in connection with eleemosynary institutions." [1] State and city governments in the United States owned 315 such vessels, over two-thirds of which were operated at the ports on the Atlantic coast and Gulf of Mexico. The largest municipal owner of vessels was New York city, which not only had the municipal ferries already described, but also had a considerable number of craft that was used by its important Department of Docks and Ferries.

[1] See United States section of this report, page 13.

FISHING CRAFT.

For the purpose of making a complete statement of the American fishing fleet operated from the ports of the Atlantic and Gulf coasts, Table 14 is included.

TABLE 14.—*Vessels engaged in the commercial fisheries of the Atlantic coast and Gulf of Mexico, and the persons employed thereon: 1902 and 1904.*[1]

	Atlantic coast and Gulf of Mexico: 1902 and 1904.
Fishing vessels:	
Number	4,631
Tonnage (net)	86,076
Value	$7,813,776
Value of outfit	$3,088,728
Transporting vessels:	
Number	1,671
Tonnage (net)	29,968
Value	$1,795,119
Value of outfit	$278,235
Persons employed:	
On fishing vessels	29,663
On transporting vessels	5,166

[1] Compiled from the reports of the Bureau of Fisheries.

The table was compiled from the reports of the Bureau of Fisheries, and inasmuch as all the figures could not be taken from one report the different items do not cover the same years; nevertheless the table indicates with practical accuracy the status of the Atlantic and Gulf fishing fleet.

The annual reports of the Commissioner of Navigation give the tonnage employed in the whale fisheries and in the cod and mackerel fisheries of the United States for every year from 1793 to the present. The figures published by the Commissioner of Navigation do not necessarily agree with those taken from the reports of the Bureau of Fisheries, for the reason that the periods covered are not identical. Moreover, the fleet employed in the whale, cod, and mackerel fisheries does not include all the vessels engaged in the commercial fisheries conducted from the ports of the United States.

In the American whaling fleet a decline continued unchecked from the close of the Civil War until 1902, when the lowest ebb was reached. From 9,320 in that year the tonnage rose to 11,020 in 1906. In the cod and mackerel fleet there was a decline which, with the exception of short periods of increase in the early seventies and in 1883, was continuous to 1899, when the tonnage was 50,679. In 1906 the tonnage was 61,439 for the United States as a whole. The cod and mackerel fleet operated from the Atlantic and Gulf ports in 1906 comprised 1,503 vessels, with a tonnage of 57,699.[2]

[2] From the report of the Commissioner of Navigation, Department of Commerce and Labor, 1906.

OWNERSHIP OF VESSELS.

The ownership of vessels is considered in three tables—15, 16, and 17. In Table 15 the number, tonnage, and value of steamships and sailing vessels are considered, the situation in 1906 being compared with that in 1889. The figures do not include unrigged craft.

TABLE 15.—OWNERSHIP FOR STEAM AND SAIL VESSELS: 1906 AND 1889.

CLASS AND OWNERSHIP.	VESSELS.				TONNAGE.				VALUE OF VESSELS.			
	Number.		Per cent of total.		Gross tons.		Per cent of total.		Amount.		Per cent of total.	
	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889
Total	11,333	8,813	100.0	100.0	2,590,799	2,034,962	100.0	100.0	$231,447,230	$108,204,622	100.0	100.0
Incorporated company	2,630	1,019	23.2	11.6	1,644,044	571,181	63.5	28.1	167,929,716	43,376,790	72.6	40.1
All other forms of ownership	8,703	7,794	76.8	88.4	946,755	1,463,781	36.5	71.9	63,517,514	64,827,832	27.4	59.9
Steam	5,413	2,536	100.0	100.0	1,457,894	741,770	100.0	100.0	193,926,327	65,518,640	100.0	100.0
Incorporated company	2,072	917	38.3	36.2	1,244,283	545,683	85.3	73.6	155,819,420	42,892,910	80.3	65.5
All other forms of ownership	3,341	1,619	61.7	63.8	213,611	196,087	14.7	26.4	38,106,907	22,625,730	19.7	34.5
Sail	5,920	6,277	100.0	100.0	1,132,905	1,293,192	100.0	100.0	37,520,903	42,685,982	100.0	100.0
Incorporated company	558	102	9.4	1.6	399,761	25,498	35.3	2.0	12,110,296	483,880	32.3	1.1
All other forms of ownership	5,362	6,175	90.6	98.4	733,144	1,267,694	64.7	98.0	25,410,607	42,202,102	67.7	98.9

The table illustrates in a striking manner the rapid substitution of corporate ownership for the partnership and individual forms of ownership. The gross tonnage of steamers and sailing vessels owned by corporations was nearly three times as great in 1906 as it was in 1889, during which period the tonnage of similar vessels owned by nonincorporated firms and by individuals decreased 35.3 per cent. The figures for value illustrate the same fact with even greater force. In 1889 the value of steamships and sailing vessels owned by corporations amounted to two-fifths of the total, whereas in 1906 the value of the vessels belonging to corporations was nearly three-fourths of the total.

The fact that the ownership of both classes of vessels—sailing vessels as well as steamers—is passing to the corporations is shown very clearly in Table 15. The figures for both the tonnage and the value of the steamers possessed by the corporations greatly exceed the figures for the steam vessels otherwise owned. The average size of the steamers belonging to the corporations is greatly in excess of that for the steamships owned by individuals and firms. In 1906 the 2,072 corporately owned steamers had an average gross tonnage of 601, while the 3,341 steamships not belonging to corporations had an average gross tonnage of only 64. The same condition is true of sailing vessels corporately and otherwise owned, as is shown by the fact that the 558 vessels belonging to corporations in 1906 had a tonnage more than one-half that of the 5,362 sailing vessels otherwise owned. In 1889 only 1.1 per cent of the total value of the sailing vessels of the Atlantic and Gulf coasts was the property of corporations, whereas in 1906, 32.3 per cent of the value was credited to the corporations. In shipping as well as in domestic industry the unmistakable tendency is toward the increased control of property by corporations.

A more detailed analysis of the ownership of the entire fleet of the Atlantic and Gulf coasts, including steamers, sailing vessels, and unrigged craft, is made in Table 16, where the extent of individual, partnership, and corporate ownership in 1906 is indicated.

TABLE 16.—*Number, gross tonnage, and value of vessels, by character of ownership, with per cent in each class: 1906.*

OWNERSHIP.	VESSELS.		TONNAGE.		VALUE OF VESSELS.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.
Total	20,032	100.0	4,851,421	100.0	$273,105,915	100.0
Individual	8,517	42.5	844,064	17.4	45,457,935	16.6
Firm	2,849	14.2	666,005	13.7	19,636,772	7.2
Incorporated company	8,341	41.6	3,246,215	66.9	199,516,774	73.1
Miscellaneous	325	1.6	95,137	2.0	8,494,434	3.1

The corporations possessed somewhat over two-fifths of the total number of craft, but the tonnage of the corporately owned shipping formed two-thirds of the total, and its value was nearly three-fourths of the aggregate. In number, tonnage, and value the individually owned craft exceeded those possessed by firms.

CLASSIFICATION OF VESSELS BY OCCUPATION OR USE.

By analyzing the shipping of the Atlantic and Gulf coasts with reference to ownership and occupation, as is done in Table 17, the character of the fleet and the services performed are indicated.

TABLE 17.—NUMBER AND GROSS TONNAGE OF VESSELS, BY CHARACTER OF OWNERSHIP AND BY CLASS AND OCCUPATION: 1906.

CLASS AND OCCUPATION.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	20,032	4,851,421	8,517	844,064	2,849	666,005	8,341	3,246,215	325	95,137
Steam	5,413	1,457,894	2,625	130,963	580	48,015	2,072	1,244,283	136	34,633
Freight and passenger	1,523	1,045,811	492	37,838	170	27,528	845	977,868	16	2,577
Tugs and other towing vessels	1,690	148,992	455	20,236	300	17,407	911	107,183	24	4,166
Ferryboats	270	162,834	25	1,874	4	199	216	141,424	25	19,337
Yachts	1,577	70,461	1,463	67,540	74	1,717	36	1,133	4	71
All other	353	29,796	190	3,475	32	1,164	64	16,675	67	8,482
Sail	5,920	1,132,905	4,091	338,536	1,189	349,135	558	399,761	82	45,473
Freight and passenger	4,227	1,105,901	2,552	315,669	1,082	347,648	542	398,702	51	43,882
Yachts	1,358	21,046	1,269	20,038	75	754	8	150	6	104
All other	335	5,958	270	2,829	32	733	8	909	25	1,487
Unrigged	8,699	2,260,622	1,801	374,565	1,080	268,855	5,711	1,602,171	107	15,031

Besides stating the total number and the gross tonnage of the steam, sail, and unrigged craft, and subdividing the steamships and sailing vessels into their different classes, according to character of service, the table shows similar data for the vessels owned by individuals, by firms, and by corporations. It will be noted that over one-half of the tonnage of individually owned steamships is credited to yachts, and that the proportion of the tonnage of steamships owned by individuals and used either in the freight and passenger services or in the towing business is small compared with the proportion which the tonnage of all vessels of similar use forms of the total tonnage. On the other hand, nearly all of the relatively small tonnage of steamers belonging to firms is credited to freight and passenger, and towing vessels. The tonnage of steamers owned by corporations was devoted mainly to the transportation of freight and passengers; at the same time the corporately owned tugs and ferryboats far exceeded in tonnage such vessels possessed by individuals and firms. Sailing vessels, however owned, were used mainly in the freight and passenger services. The only other important subclass of sailing vessels is the yacht, the ownership of which would, in most cases, naturally be individual. This table, like the preceding ones, shows the preponderance of the unrigged craft over steamers and over sailing vessels as regards total tonnage.

CONSTRUCTION.

The classification of the shipping of the Atlantic coast and Gulf of Mexico with reference to material of construction is shown for 1889 and for 1906 in Table 18.

TABLE 18.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CHARACTER OF CONSTRUCTION AND BY CLASS AND OCCUPATION: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1906	20,032	4,851,421	$273,105,915	1,148	1,247,838	$155,776,134	18,827	3,591,278	$115,877,581	57	12,305	$1,452,200
	1889	12,238	2,658,445	116,042,062	434	364,283	33,622,030	11,714	2,269,558	81,236,912	90	24,604	1,183,120
Steam	1906	5,413	1,457,894	193,926,327	993	1,086,446	147,640,277	4,388	365,616	45,280,050	32	5,832	1,006,000
	1889	2,536	741,770	65,518,640	421	355,065	32,897,230	2,091	381,340	32,073,610	24	5,365	547,800
Freight and passenger	1906	1,523	1,045,811	121,136,485	395	849,069	104,382,729	1,123	193,987	16,563,756	5	2,755	190,000
	1889	810	487,939	36,989,280	188	254,457	21,720,810	612	229,165	14,988,470	10	4,317	280,000
Tugs and other towing vessels	1906	1,690	148,992	25,894,551	323	70,134	12,055,761	1,363	78,582	13,808,790	4	*276	30,000
	1889	1,095	61,359	10,203,330	103	8,588	1,626,800	986	52,535	8,554,730	6	236	21,800
Ferryboats	1906	270	162,834	19,970,466	127	114,498	15,971,767	143	48,336	3,998,699	.....	.....	.....
	1889	214	98,174	7,907,700	59	40,510	3,936,500	155	57,664	3,971,200	.....	.....	.....
Yachts	1906	1,577	70,461	21,290,339	107	36,309	11,807,070	1,449	31,944	8,797,269	21	2,148	686,000
	1889	170	11,328	3,520,610	25	4,864	1,649,720	142	6,111	1,735,890	3	353	135,000
All other	1906	353	29,796	5,634,486	41	16,376	3,422,950	310	12,767	2,111,536	2	653	100,000
	1889	247	82,970	6,897,720	46	46,646	3,963,400	196	35,865	2,823,320	5	459	111,000
Sail	1906	5,920	1,132,905	37,520,903	76	84,726	4,323,786	5,820	1,042,654	32,762,917	24	5,525	434,200
	1889	6,277	1,293,192	42,685,982	13	9,218	724,800	6,198	1,264,735	41,325,862	66	19,239	635,320
Freight and passenger	1906	4,227	1,105,901	33,213,849	57	82,470	3,588,786	4,168	1,018,738	29,389,063	2	4,693	236,000
	1889	5,229	1,260,362	38,777,627	7	8,737	514,500	5,163	1,232,597	37,658,057	59	19,028	605,070
Yachts	1906	1,358	21,046	3,775,743	19	2,256	735,000	1,317	17,958	2,842,543	22	832	198,200
	1889	628	14,428	2,681,455	6	481	210,300	619	13,875	2,450,655	3	72	20,500
All other	1906	335	5,958	531,311	.....	.....	.....	335	5,958	531,311	.....	.....	.....
	1889	420	18,402	1,226,900	.....	.....	.....	416	18,263	1,217,150	4	139	9,750
Unrigged [1]	1906	8,699	2,260,622	41,658,685	79	76,666	3,812,071	8,619	2,183,008	37,834,614	1	948	12,000
	1889	3,425	623,483	7,837,440	.....	.....	.....	3,425	623,483	7,837,440	.....	.....	.....

[1] The character of construction was not reported in 1889, but for purposes of comparison in this table all vessels are assumed to be of wood.

The progress made in the tonnage of iron and steel vessels was much more rapid than the gains in the tonnage of vessels constructed of wood.

Between 1889 and 1906 the tonnage of steamships operated from the Atlantic and Gulf ports nearly doubled, and the value almost trebled; at the same time there was a decrease both in the tonnage and in the value of sailing vessels. Since iron and steel are used to a great extent in the construction of steam vessels, the increase in steam tonnage means a gain in the use of iron and steel. The gross tonnage of steam vessels built of iron and steel was three times as great in 1906 as it was in 1889, and their value was more than four times as much. Wooden steamers increased in number and value from 1889 to 1906, but fell off in gross tonnage. There was, moreover, some gain in the number, tonnage, and value of steamers of composite construction, the use of wood and steel in building yachts being frequent. The wooden sailing vessels, except yachts, are rapidly decreasing.

The census of 1889 did not state the kind of material of which the unrigged craft then operated were constructed; there could, however, have been very little, if any, use of iron and steel in the construction of barges and lighters at that time. The gain in the tonnage of unrigged craft was extraordinarily large, both absolutely and relatively. In 1889 the tonnage of the unrigged craft constituted less than one-fourth of the total, whereas in 1906 it comprised nearly one-half of the aggregate gross tonnage. As unrigged craft can be moved only by the use of tugs, the growth of the tonnage of unrigged shipping has naturally been accompanied by an increase in the tonnage of towing vessels.

The number and gross tonnage of steamships, sailing vessels, and unrigged craft built along the Atlantic and Gulf coasts of the United States and documented each year from 1889 to 1906 are shown in Table 19, grouped according to the character of the materials employed in their construction.

TABLE 19.—NUMBER AND GROSS TONNAGE OF VESSELS BUILT AND DOCUMENTED EACH YEAR, BY CLASS AND BY CHARACTER OF CONSTRUCTION: 1889 TO 1906.[1, 2].

YEAR.	AGGREGATE.										STEAM.									
	Total.		Iron.		Steel.		Wood.		Composite.		Total.		Iron.		Steel.		Wood.		Composite.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	651	126,607	.....	.....	50	46,073	601	80,534	.....	.....	293	56,030	.....	.....	45	42,363	248	13,667	.....	.....
1905	655	210,537	.....	.....	56	94,218	599	116,319	.....	.....	239	94,202	.....	.....	42	84,894	197	9,308	.....	.....
1904	695	186,559	.....	.....	45	84,138	650	102,421	.....	.....	232	78,321	.....	.....	37	66,473	195	11,848	.....	.....
1903	837	244,748	.....	.....	54	121,189	783	123,559	.....	.....	231	119,588	.....	.....	48	107,283	183	12,305	.....	.....
1902	970	236,991	1	193	52	107,349	917	129,449	.....	.....	251	113,370	1	193	47	97,919	203	15,258	.....	.....
1901	823	236,948	1	10	55	100,601	767	136,337	.....	.....	215	98,368	1	10	45	85,556	169	12,802	.....	.....
1900	804	207,652	.....	.....	57	80,030	747	127,622	.....	.....	170	80,001	.....	.....	51	70,548	119	9,453	.....	.....
1899	631	154,586	.....	.....	55	60,356	576	94,230	.....	.....	168	61,868	.....	.....	49	51,326	119	10,542	.....	.....
1898	514	63,090	1	462	34	20,078	478	42,339	1	211	134	25,341	1	462	26	17,014	106	7,654	1	211
1897	609	96,009	1	159	33	22,954	575	72,896	.....	.....	123	31,095	1	159	23	21,308	99	9,628	.....	.....
1896	418	91,724	1	57	21	32,034	396	59,633	.....	.....	98	44,222	1	57	21	32,034	76	12,131	.....	.....
1895	453	59,984	3	2,439	29	20,621	421	36,924	.....	.....	111	30,955	3	2,439	24	19,916	84	8,600	.....	.....
1894	592	74,708	5	687	22	30,798	565	43,223	.....	.....	141	37,819	5	687	20	26,149	116	10,983	.....	.....
1893	599	89,109	16	15,441	12	13,500	570	59,765	1	403	139	41,659	16	15,441	11	12,119	111	13,696	1	403
1892	988	118,094	14	6,078	14	16,041	960	95,975	.....	.....	207	35,981	14	6,078	14	16,041	179	13,862	.....	.....
1891	944	218,392	[3] 32	35,594	5	10,671	907	172,127	.....	.....	216	67,074	[3] 32	35,594	3	9,341	181	22,139	.....	.....
1890	663	156,756	[4] 33	29,094	7	12,682	623	114,980	.....	.....	155	54,240	[4] 33	29,094	7	12,682	115	12,464	.....	.....
1889	657	93,912	19	17,223	11	5,849	627	70,840	.....	.....	149	41,308	18	17,190	11	5,849	120	18,269	.....	.....

YEAR.	SAIL.								UNRIGGED.					
	Total.		Iron.		Steel.		Wood.		Total.		Steel.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	199	30,584	.....	.....	4	3,077	195	27,507	159	39,993	1	633	158	39,360
1905	278	74,912	.....	.....	5	3,225	273	71,687	138	41,423	9	6,099	129	35,324
1904	293	60,079	.....	.....	4	15,290	289	44,789	170	48,159	4	2,375	166	45,784
1903	399	63,794	.....	.....	4	12,184	395	51,610	207	61,366	2	1,722	205	59,644
1902	519	71,639	.....	.....	3	8,406	516	63,233	200	51,982	2	1,024	198	50,958
1901	398	87,399	.....	.....	8	13,300	390	74,099	210	51,181	2	1,745	208	49,436
1900	426	76,249	.....	.....	6	9,482	420	66,767	208	51,402	.....	.....	208	51,402
1899	354	66,160	.....	.....	2	6,207	352	59,953	109	26,558	4	2,823	105	23,735
1898	302	17,909	.....	.....	.....	.....	302	17,909	78	19,840	8	3,064	70	16,776
1897	279	19,959	.....	.....	.....	.....	279	19,959	207	44,955	10	1,646	197	43,309
1896	287	37,501	.....	.....	.....	.....	287	37,501	33	10,001	.....	.....	33	10,001
1895	320	24,633	.....	.....	.....	.....	320	24,633	22	4,396	5	705	17	3,691
1894	421	30,659	.....	.....	2	4,649	419	26,010	30	6,230	.....	.....	30	6,230
1893	408	33,524	.....	.....	.....	.....	408	33,524	52	13,926	1	1,381	51	12,545
1892	716	69,128	.....	.....	.....	.....	716	69,128	65	12,985	.....	.....	65	12,985
1891	635	127,147	.....	.....	.....	.....	635	127,147	93	24,171	2	1,330	91	22,841
1890	433	84,631	.....	.....	.....	.....	433	84,631	75	17,885	.....	.....	75	17,885
1889	417	37,279	1	33	.....	.....	416	37,246	91	15,325	.....	.....	91	15,325

[1] Exclusive of yachts.
[2] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.
[3] Includes 2 vessels, tonnage 7,886, built of iron and steel.
[4] Includes 1 vessel, tonnage 2,707, built of iron and steel.

A limited number of vessels not built in the American yards are annually admitted to American registry under general acts of Congress.

The use of iron in the construction of the hulls of vessels has been abandoned. In 1889, 19 of the vessels built on the Atlantic and Gulf coasts had iron hulls; since 1895 there have been only 5 vessels thus built; and since 1902 none has been so constructed. The use of steel has largely increased. During 1889 only 11 vessels with steel hulls were built on the Atlantic and Gulf coasts; during 1890 only 7 vessels of this kind were constructed; and in 1891 only 5. In 1906, however, there were 50 vessels built of steel, but the figures for 1906 understate the progress that has been made in the use of steel in ship construction. The years from 1900 to 1903 were especially prosperous in American shipyards, and in each of these years the number and tonnage of steel-built vessels were larger than in 1906. With the progress of the American marine and the advance of the American shipbuilding industry, there will certainly be an increasing use made of steel. In the construction of American vessels in the shipyards of the Atlantic coast and Gulf of Mexico, wood is still used more largely than steel. Table 19, however, shows that the number and tonnage of wooden vessels are neither increasing nor declining. During the eighteen years covered by the table only 2 vessels constructed of both steel and wood were documented. Yachts are not included in this table. As shown in Table 18 the composite steam yachts increased from 3 in 1889 to 21 in 1906.

Most of the vessels built of steel are propelled by engines, although a few steel sailing vessels are documented each year. The number of wooden vessels with engines exceeded the number of wooden sailing ships in 1906, although the tonnage of the wooden sailing vessels is double that of the wooden steamers. In the construction of tugs, ferryboats, and passenger vessels for operation in quiet waters, and in the building of yachts, wood is still largely used. Likewise wood is used almost altogether in the construction of barges, lighters, and unrigged craft. In 1906 there was only 1 steel vessel of this class documented. During six of the years between 1889 and 1906 no unrigged craft of steel construction was documented.

REGISTERED AND DOCUMENTED VESSELS.

The navigation laws of the United States[1] stipulate that "vessels which may be captured in war by citizens of the United States and lawfully condemned as prize, or which may be adjudged to be forfeited for a breach of the laws of the United States, being wholly owned by citizens and no others, may be registered" under the American flag. The law also states that—

> The Commissioner of Navigation may issue a register or enrollment for any vessel built in a foreign country, whenever such vessel shall be wrecked in the United States, and shall be purchased and repaired by a citizen of the United States, if it shall be proved to the satisfaction of the Commissioner that the repairs put upon such vessel are equal to three-fourths of the cost of the vessel when so repaired.
>
> A vessel registered pursuant to law, which by sale has become the property of a foreigner, shall be entitled to a new register upon afterwards becoming American property, unless it has been enlarged or undergone change in build outside of the United States.

Table 20 shows the number, tonnage, and material used in the construction of vessels admitted to American registry under the general act of Congress of December 23, 1852, which was repealed February 22, 1906.

As the result of the Spanish-American War the number of vessels thus admitted was greater in 1898, 1899, and 1900 than in any other year except 1889, when 15 wooden craft, 12 of them sailing vessels and 3 unrigged, were added to that part of the American marine that is operated from the Atlantic coast and Gulf of Mexico. Some vessels have been admitted to American registry by special acts of Congress. For instance, the acts of May 10, 1892, and February 14, 1893, made possible the admission of the *City of New York* and the *City of Paris*, of foreign construction but of American ownership, to registration under the American flag.[2]

[1] Bureau of Navigation, "Navigation Laws of the United States," 1903, pages 17 and 18.

[2] The present names of these two vessels are the *New York* and the *Philadelphia*.

TABLE 20.—NUMBER AND GROSS TONNAGE OF VESSELS ADMITTED AT ATLANTIC AND GULF PORTS TO AMERICAN REGISTRY BY GENERAL ACT OF CONGRESS, BY CLASS AND BY CHARACTER OF CONSTRUCTION: 1889 TO 1906.[1]

YEAR.	AGGREGATE.								STEAM.							
	Total.		Iron.		Steel.		Wood.		Total.		Iron.		Steel.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	5	9,081	2	3,345	2	5,633	1	103	3	8,554	1	2,921	2	5,633	.....	.....
1905	6	8,941	1	1,855	3	5,335	2	1,751	4	7,190	1	1,855	3	5,335	.....	.....
1904	2	5,253	1	693	1	4,560	.....	.....	1	4,560	.....	.....	1	4,560	.....	.....
1903	6	12,821	.....	.....	3	10,959	3	1,862	3	10,959	.....	.....	3	10,959	.....	.....
1902	4	4,399	1	1,347	1	2,214	2	838	1	2,214	.....	.....	1	2,214	.....	.....
1901	7	12,382	2	4,341	3	7,412	2	629	5	11,753	2	4,341	3	7,412	.....	.....
1900	12	7,993	2	4,541	.....	.....	10	3,452	1	2,798	1	2,798	.....	.....	.....	.....
1899	12	11,387	4	7,168	.....	.....	8	4,219	2	5,096	2	5,096	.....	.....	.....	.....
1898	12	12,558	4	6,544	1	3,362	7	2,652	4	8,030	3	4,668	1	3,362	.....	.....
1897	7	5,276	1	2,016	.....	.....	6	3,260	1	2,016	1	2,016	.....	.....	.....	.....
1896	6	5,650	1	2,461	2	2,870	3	319	1	1,696	.....	.....	1	1,696	.....	.....
1895	5	6,846	1	3,428	1	2,897	3	521	1	2,897	.....	.....	1	2,897	.....	.....
1894	4	1,843	1	135	.....	.....	3	1,708	1	135	1	135	.....	.....	.....	.....
1893	6	2,850	.....	.....	1	1,602	5	1,248	1	1,602	.....	.....	1	1,602	.....	.....
1892	9	3,108	.....	.....	1	1,044	8	2,064	1	1,044	.....	.....	1	1,044	.....	.....
1891	6	2,555	.....	.....	[2]1	451	5	2,104	[2]1	451	.....	.....	[2]1	451	.....	.....
1890	11	6,324	3	2,448	.....	.....	8	3,876	3	2,448	3	2,448	.....	.....	.....	.....
1889	15	5,968	.....	.....	.....	.....	15	5,968	.....	.....	.....	.....	.....	.....	.....	.....

YEAR.	SAIL.								UNRIGGED.					
	Total.		Iron.		Steel.		Wood.		Total.		Iron.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	2	527	1	424	.....	.....	1	103	.....	.....	.....	.....	.....	.....
1905	2	1,751	.....	.....	.....	.....	2	1,751	.....	.....	.....	.....	.....	.....
1904	1	693	1	693	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1903	2	594	.....	.....	.....	.....	2	594	1	1,268	.....	.....	1	1,268
1902	1	170	.....	.....	.....	.....	1	170	2	2,015	1	1,347	1	668
1901	2	629	.....	.....	.....	.....	2	629	.....	.....	.....	.....	.....	.....
1900	8	3,392	1	1,743	.....	.....	7	1,649	3	1,803	.....	.....	3	1,803
1899	8	4,982	2	2,072	.....	.....	6	2,910	2	1,309	.....	.....	2	1,309
1898	8	4,528	1	1,876	.....	.....	7	2,652	.....	.....	.....	.....	.....	.....
1897	5	2,937	.....	.....	.....	.....	5	2,937	1	323	.....	.....	1	323
1896	5	3,954	1	2,461	1	1,174	3	319	.....	.....	.....	.....	.....	.....
1895	2	3,501	1	3,428	.....	.....	1	73	2	448	.....	.....	2	448
1894	3	1,708	.....	.....	.....	.....	3	1,708	.....	.....	.....	.....	.....	.....
1893	4	992	.....	.....	.....	.....	4	992	1	256	.....	.....	1	256
1892	8	2,064	.....	.....	.....	.....	8	2,064	.....	.....	.....	.....	.....	.....
1891	5	2,104	.....	.....	.....	.....	5	2,104	.....	.....	.....	.....	.....	.....
1890	8	3,876	.....	.....	.....	.....	8	3,876	.....	.....	.....	.....	.....	.....
1889	12	4,801	.....	.....	.....	.....	12	4,801	3	1,167	.....	.....	3	1,167

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.

[2] Yacht.

The number and tonnage of documented vessels added to the fleet of the Atlantic and Gulf coasts during each year from 1889 to 1906 are shown in Table 21, which has been compiled from the reports of the Commissioner of Navigation. This table shows almost all of the yearly additions made to the fleet; the number shown falls short of the total because it does not include undocumented craft.

The reports of the Commissioner of Navigation include a few vessels classed as "added from other sources," the number and tonnage of which the Census found it impracticable to obtain. The omission of this small group of vessels from Table 21 is not deemed a serious matter, because the craft were mainly rebuilt vessels which really do not constitute an addition to the fleet. Table 21, accordingly, comprises practically all vessels, except yachts, admitted at Atlantic and Gulf ports to American enrollment or registry, both those constructed in the United States and those built abroad and admitted to American registry under acts of Congress. The facts—to which attention has already been called—regarding the increasing use of steel for construction and steam for power are clearly shown.

TABLE 21.—NUMBER AND GROSS TONNAGE OF VESSELS ADDED TO THE DOCUMENTED FLEET EACH YEAR, BY CLASS AND BY CHARACTER OF CONSTRUCTION: 1889 TO 1906.[1]

YEAR.	AGGREGATE.										STEAM.									
	Total.		Iron.		Steel.		Wood.		Composite.		Total.		Iron.		Steel.		Wood.		Composite.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	666	141,809	3	3,574	53	55,342	609	82,797	1	96	303	69,491	2	3,150	48	51,632	252	14,613	1	96
1905	668	224,840	1	1,855	60	103,220	607	119,765	.....	.....	247	105,421	1	1,855	46	93,896	200	9,670	.....	.....
1904	707	195,138	3	2,344	46	88,698	658	104,096	.....	.....	242	84,909	2	1,651	38	71,033	202	12,225	.....	.....
1903	853	261,701	2	386	57	132,148	794	129,167	.....	.....	237	130,772	1	122	51	118,242	185	12,408	.....	.....
1902	984	248,973	3	2,129	56	114,172	925	132,672	.....	.....	255	120,025	1	193	50	104,335	204	15,497	.....	.....
1901	837	254,786	5	8,055	59	109,061	773	137,670	.....	.....	223	113,249	4	7,026	48	92,968	171	13,255	.....	.....
1900	835	230,867	5	12,463	60	82,498	770	135,906	.....	.....	182	92,808	4	10,720	52	71,027	126	11,061	.....	.....
1899	720	209,544	6	10,982	57	63,561	657	135,001	.....	.....	182	80,608	4	8,910	51	54,531	127	17,167	.....	.....
1898	540	94,121	9	15,358	39	32,559	491	45,993	1	211	150	50,600	7	12,359	31	29,495	111	8,535	1	211
1897	619	102,573	3	2,299	33	22,954	583	77,320	.....	.....	125	33,235	3	2,299	23	21,308	99	9,628	.....	.....
1896	431	105,188	2	2,518	25	41,224	404	61,446	.....	.....	104	52,567	1	57	24	40,050	79	12,460	.....	.....
1895	465	72,782	7	9,055	30	23,518	428	40,209	.....	.....	115	37,040	6	5,627	25	22,813	84	8,600	.....	.....
1894	599	78,021	8	1,904	22	30,798	569	45,319	.....	.....	145	39,424	8	1,904	20	26,149	117	11,371	.....	.....
1893	612	115,047	16	15,441	16	37,541	579	61,662	1	403	146	66,132	16	15,441	15	36,160	114	14,128	1	403
1892	1,001	121,580	14	6,078	15	17,085	972	98,417	.....	.....	210	37,275	14	6,078	15	17,085	181	14,112	.....	.....
1891	970	240,446	[2] 42	46,870	[3] 9	16,965	919	176,611	.....	.....	233	84,825	[2] 42	46,870	[3] 7	15,635	184	22,320	.....	.....
1890	680	166,378	[4] 38	33,256	7	12,682	635	120,440	.....	.....	162	58,451	[4] 38	33,256	7	12,682	117	12,513	.....	.....
1889	677	101,761	20	19,058	11	5,849	[5] 646	76,854	.....	.....	152	43,167	19	19,025	11	5,849	[5] 122	18,293	.....	.....

YEAR.	SAIL.								UNRIGGED.							
	Total.		Iron.		Steel.		Wood.		Total.		Iron.		Steel.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	203	32,165	1	424	4	3,077	198	28,664	160	40,153	.....	.....	1	633	159	39,520
1905	282	76,725	.....	.....	5	3,225	277	73,500	139	42,694	.....	.....	9	6,099	130	36,595
1904	295	62,070	1	693	4	15,290	290	46,087	170	48,159	.....	.....	4	2,375	166	45,784
1903	406	67,083	.....	.....	4	12,184	402	54,899	210	63,846	1	264	2	1,722	207	61,860
1902	525	74,405	1	589	3	8,406	521	65,410	204	54,543	1	1,347	3	1,431	200	51,765
1901	404	90,356	1	1,029	9	14,348	394	74,979	210	51,181	.....	.....	2	1,745	208	49,436
1900	439	83,931	1	1,743	7	11,064	431	71,124	214	54,128	.....	.....	1	407	213	53,721
1899	426	100,736	2	2,072	2	6,207	422	92,457	112	28,200	.....	.....	4	2,823	108	25,377
1898	311	23,560	2	2,999	.....	.....	309	20,561	79	19,961	.....	.....	8	3,064	71	16,897
1897	286	24,060	.....	.....	.....	.....	286	24,060	208	45,278	.....	.....	10	1,646	198	43,632
1896	294	42,620	1	2,461	1	1,174	292	38,985	33	10,001	.....	.....	.....	.....	33	10,001
1895	325	30,500	1	3,428	.....	.....	324	27,072	25	5,242	.....	.....	5	705	20	4,537
1894	424	32,367	.....	.....	2	4,649	422	27,718	30	6,230	.....	.....	.....	.....	30	6,230
1893	412	34,516	.....	.....	.....	.....	412	34,516	54	14,399	.....	.....	1	1,381	53	13,018
1892	726	71,320	.....	.....	.....	.....	726	71,320	65	12,985	.....	.....	.....	.....	65	12,985
1891	642	130,500	.....	.....	.....	.....	642	130,500	95	25,121	.....	.....	2	1,330	93	23,791
1890	443	90,042	.....	.....	.....	.....	443	90,042	75	17,885	.....	.....	.....	.....	75	17,885
1889	431	42,102	1	33	.....	.....	430	42,069	94	16,492	.....	.....	.....	.....	94	16,492

[1] Embraces all vessels, exclusive of yachts except 1 in 1889 and 1 in 1891, reported by the Commissioner of Navigation as built, admitted to registry by acts of Congress, renationalized, purchased from the United States, or captured from enemy.
[2] Includes 2 vessels, tonnage 7,886, built of iron and steel.
[3] Includes 1 yacht, with a gross tonnage of 451.
[4] Includes 1 vessel, tonnage 2,707, built of iron and steel.
[5] Includes 1 yacht, with a gross tonnage of 13.

NUMBER AND TONNAGE OF VESSELS.

The gross and net tonnage of the various subclasses of steam, sail, and unrigged craft of the Atlantic and Gulf coasts in 1906 are shown in Table 22.

The net tonnage of the steamers averages two-thirds the gross tonnage. In the case of sailing vessels the average is somewhat higher, the net being approximately nine-tenths of the gross tonnage. In unrigged craft almost the entire capacity of the vessel is available for cargo, consequently the net tonnage is but slightly less than the gross. The general rule among shipping men is that in a modern freight steamer the net tonnage, when measured in accordance with the American laws, will average about two-thirds the gross. The figures in Table 22 prove this general rule of business men to be an accurate one. The ratio of net, gross, and cargo tonnage is sometimes expressed by saying that the gross tonnage is 1½ times the net, and the cargo 2¼ times the net; that is, the ratios are 1 to 1½ to 2¼. With sailing vessels the ratio of net to gross tonnage is ordinarily stated to be as 7 to 8; that is, the net tonnage is seven-eighths of the gross. The table, however, shows a somewhat higher ratio. Assuming the net tonnage to be seven-eighths of the gross, the ratio of net, gross, and cargo tonnage for sailing vessels would be as 7 to 8 to 12.

TABLE 22.—*Gross and net tonnage, with per cent net is of gross tonnage, by class and occupation of vessels: 1906.*

CLASS AND OCCUPATION.	Gross tonnage.	NET TONNAGE.	
		Number of tons.	Per cent of gross tonnage.
Total	4,851,421	4,186,451	86.3
Steam	1,457,894	972,320	66.7
Freight and passenger	1,045,811	704,560	67.4
Tugs and other towing vessels	148,992	90,021	60.4
Ferryboats	162,834	113,531	69.7
Yachts	70,461	45,228	64.2
All other	29,796	18,980	63.7
Sail	1,132,905	1,012,197	89.3
Freight and passenger	1,105,901	987,398	89.3
Yachts	21,046	19,317	91.8
All other	5,958	5,482	92.0
Unrigged	2,260,622	2,201,934	97.4
Canal boats	103,877	101,195	97.4
All other	2,156,745	2,100.739	97.4

The average size, value per ton, and value per vessel of the steam, sail, and unrigged craft of the Atlantic and Gulf coasts in 1889 and 1906 are stated in Table 23.

TABLE 23.—*Number, gross tonnage, and value of different classes of vessels: 1906 and 1889.*

CLASS.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Average tonnage per vessel.	Average value per ton.	Average value per vessel.
Total	1906	20,032	4,851,421	$273,105,915	242	$56	$13,633
	1889	12,238	2,658,445	116,042,062	217	44	9,482
Steam	1906	5,413	1,457,894	193,926,327	269	133	35,826
	1889	2,536	741,770	65,518,640	292	88	25,835
Sail	1906	5,920	1,132,905	37,520,903	191	33	6,338
	1889	6,277	1,293,192	42,685,982	206	33	6,800
Unrigged	1906	8,699	2,260,622	41,658,685	260	18	4,789
	1889	3,425	623,483	7,837,440	182	13	2,288

The somewhat surprising fact is shown that the average size of both steamers and sailing vessels was less in 1906 than in 1889. Only in unrigged craft was there an increase in average capacity. The average value per ton of the steam vessels has largely increased; that of sailing vessels has remained constant; and that of unrigged craft has become larger.

The explanation of the small average size of steamships and sailing vessels is found in Table 24, where steam, sail, and unrigged craft are grouped according to gross tonnage.

It will be noted that over one-half of the steamers were each of less than 50 tons gross register; that four-fifths of them were of less than 200 tons gross register; and that only 30 were of 5,000 tons or more gross register. It will be remembered that the vessels classified as steamships include the considerable number of those operated by gasoline and other engines. The sailing vessels of the Atlantic and Gulf coasts averaged less than 200 tons gross register; almost two-thirds of the total number were of less than 50 tons gross register, and about four-fifths were of less than 200 tons gross register. There were only 29 sailing vessels with a gross register amounting to 2,500 tons or over. The unrigged craft averaged much larger than the sailing vessels and nearly as great as the steamships. The average size of this class of shipping is made high by the extensive use of large capacity barges in the coastwise traffic.

TABLE 24.—*Vessels grouped according to gross tonnage: 1906.*

TONNAGE.	Total.	Steam.	Sail.	Unrigged.
Total:				
Number of vessels	20,032	5,413	5,920	8,699
Gross tonnage	4,851,421	1,457,894	1,132,905	2,260,622
5 to 49 tons:				
Number of vessels	7,413	3,019	3,792	602
Gross tonnage	133,812	55,988	63,191	14,633
50 to 99 tons:				
Number of vessels	2,129	763	592	774
Gross tonnage	151,754	55,734	40,928	55,092
100 to 199 tons:				
Number of vessels	3,839	590	299	2,950
Gross tonnage	549,840	83,092	42,889	423,859
200 to 299 tons:				
Number of vessels	2,127	225	169	1,733
Gross tonnage	513,836	54,840	41,971	417,025
300 to 399 tons:				
Number of vessels	1,429	107	137	1,185
Gross tonnage	486,094	37,370	47,615	401,109
400 to 499 tons:				
Number of vessels	869	115	155	599
Gross tonnage	380,276	51,113	69,299	259,864
500 to 999 tons:				
Number of vessels	1,441	249	485	707
Gross tonnage	997,370	176,096	356,998	464,276
1,000 to 2,499 tons:				
Number of vessels	585	184	262	139
Gross tonnage	852,007	289,359	380,716	181,932
2,500 to 4,999 tons:				
Number of vessels	169	131	28	10
Gross tonnage	556,311	429,399	84,080	42,832
5,000 tons and over:				
Number of vessels	31	30	1	.....
Gross tonnage	230,121	224,903	5,218	.....

The information contained in Tables 22, 23, and 24 is supplemented by Table 25, which gives the average size and the average value per vessel and per ton of the iron and steel vessels, the wooden ships, and the craft of composite construction. Figures for both 1889 and 1906 are presented.

The average value per vessel and per ton of the total shipping of the Atlantic and Gulf coasts increased between those years; the gain, however, was in iron and steel and composite vessels and not in those of wooden construction, which show a decline in value both per vessel and per ton. The decline in wooden vessels is most marked in steamers, wood being used for small steamers and steel for larger craft. The newer wooden steamers are more valuable per ton than their predecessors were. Wooden steam tugs and ferryboats had a higher value per vessel and per ton in 1906 than in 1889. All classes of iron and steel steamers except "all other" increased in size and value per vessel. Iron and steel sailing vessels, as a whole, and sailing yachts increased in size and value; but the iron and steel sailing vessels used in the passenger and freight services decreased in value. Unrigged craft, as a whole, show a large growth in average tonnage and value.

TABLE 25.—AVERAGE GROSS TONNAGE AND VALUE PER VESSEL AND AVERAGE VALUE PER TON: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.
Total	1906	242	$13,633	$56	1,087	$135,693	$125	191	$6,155	$32	216	$25,477	$118
	1889	217	9,482	44	839	77,470	92	194	6,935	36	273	13,146	48
Steam	1906	269	35,826	133	1,094	148,681	136	83	10,319	124	182	31,438	172
	1889	292	25,835	88	843	78,141	93	182	15,339	84	224	22,825	102
Freight and passenger	1906	687	79,538	116	2,150	264,260	123	173	14,750	85	551	38,000	69
	1889	602	45,666	76	1,353	115,536	85	374	24,491	65	432	28,000	65
Tugs and other towing vessels	1906	88	15,322	174	217	37,324	172	58	10,131	176	69	7,500	109
	1889	56	9,318	166	83	15,794	189	53	8,676	163	39	3,633	92
Ferryboats	1906	603	73,965	123	902	125,762	139	338	27,963	83	.....	.....	.....
	1889	459	36,952	81	687	66,720	97	372	25,621	69	.....	.....	.....
Yachts	1906	45	13,501	302	340	110,346	325	22	6,071	275	102	32,667	319
	1889	67	20,709	311	195	65,989	339	43	12,225	284	118	45,000	382
All other	1906	84	15,962	189	399	83,487	209	41	6,811	165	327	50,000	153
	1889	336	27,926	83	1,014	86,161	85	183	14,405	79	92	22,200	242
Sail	1906	191	6,338	33	1,115	56,892	51	179	5,629	31	230	18,092	79
	1889	206	6,800	33	709	55,754	79	204	6,668	33	292	9,626	33
Freight and passenger	1906	262	7,858	30	1,447	62,961	44	244	7,051	29	2,347	118,000	50
	1889	241	7,416	31	1,248	73,500	59	239	7,294	31	323	10,255	32
Yachts	1906	15	2,780	179	119	38,684	326	14	2,158	158	38	9,009	238
	1889	23	4,270	186	80	35,050	437	22	3,959	177	24	6,833	285
All other	1906	18	1,586	89	.....	.....	.....	18	1,586	89	.....	.....	.....
	1889	44	2,921	67	.....	.....	.....	44	2,926	67	35	2,438	70
Unrigged	1906	260	4,789	18	970	48,254	50	253	4,390	17	948	12,000	13
	1889	182	2,288	13	.....	.....	.....	182	2,288	13	.....	.....	.....

CHARACTER OF PROPULSION AND HORSEPOWER.

The vessels classified as steamers include not only those propelled by steam but also those driven by gasoline and other engines. The power, moreover, is applied by screws, side wheels, and stern wheels.

Of the vessels propelled by mechanical power, about nine-tenths were driven with screws. One of the two ferryboats classed as "all other" was operated by a center paddle wheel and the other by a cable device.

The large number of vessels having gasoline engines is one of the striking facts shown in Table 26. Their total gross tonnage, however, constitutes but a small fraction of the gross tonnage of steam vessels. Most of the gasoline engines are used to drive screws, but 26 craft having stern wheels and 2 having side wheels were equipped with gasoline engines.

TABLE 26.—*Character of propulsion and power of steam vessels: 1906.*

CHARACTER OF PROPULSION AND POWER.	Number of vessels.	Gross tonnage.	Horsepower of engines.
Total	5,413	1,457,894	1,758,378
Steam	3,434	1,423,750	1,712,382
Gasoline	1,974	34,072	45,932
All other	5	72	64
Screw	4,858	1,169,305	1,458,521
Steam	2,907	1,135,578	1,413,088
Gasoline	1,946	33,655	45,369
All other	5	72	64
Side wheel	370	270,853	279,705
Steam	368	270,831	279,675
Gasoline	2	22	30
Stern wheel	183	17,621	20,090
Steam	157	17,226	19,557
Gasoline	26	395	533
All other	2	115	62
Steam	2	115	62

Table 27 shows the classification by propulsion and power of vessels, grouped with reference to occupation.

TABLE 27.—CHARACTER OF PROPULSION AND HORSEPOWER OF STEAM VESSELS, BY OCCUPATION: 1906.

OCCUPATION.	CHARACTER OF PROPULSION.					HORSEPOWER OF ENGINES.			
	Total.	Screw (number).	Side wheel (number).	Stern wheel (number).	All other (number).	Total.	Steam.	Gasoline.	All other.
Total	5,413	4,858	370	183	2	1,758,378	1,712,382	45,932	64
Freight and passenger	1,523	1,225	194	104	.....	1,003,177	992,963	10,214	.....
Tugs and other towing vessels	1,690	1,606	11	73	.....	382,557	381,051	1,506	.....
Ferryboats	270	111	156	1	2	158,335	158,140	195	.....
Yachts	1,577	1,573	1	3	.....	172,965	142,203	30,706	56
All other	353	343	8	2	.....	41,344	38,025	3,311	8

INCOME.

The gross income derived from the operation of the fleet of the Atlantic and Gulf coasts in 1906 was $159,759,924, more than two-thirds of which was secured from freight and passenger business, and less than one-third from other sources.

TABLE 28.—*Gross income—all vessels and craft, by occupation: 1906.*

OCCUPATION.	Total.	Freight.	Passenger.	All other.
Total	$159,759,924	$83,890,161	$25,643,332	$50,226,431
Freight and passenger	92,096,988	68,185,461	18,208,365	5,703,162
Towing vessels and unrigged craft	54,727,996	15,697,425	46,254	38,984,317
All other	12,934,940	7,275	7,388,713	5,538,952

The earnings of tugs and other towing vessels which are so largely used in the more important harbors and in towing coal barges along the coast amounted to $54,727,996. This total includes the earnings of the unrigged craft, and is considerably more than one-third of the gross revenue for the fleet of the Atlantic and Gulf coasts. The relative unimportance of the passenger business as compared with the freight is also a striking fact, less than one-sixth of the total income having been obtained from the transportation of passengers.

EMPLOYEES AND WAGES.

During the year 1906 an average of 109,985 employees was engaged in conducting the transportation by water on the Atlantic and Gulf coasts.

TABLE 29.—*Employees, and salaries and wages: 1906.*

	Number of employees.	Salaries and wages.
Total	109,985	$59,125,132
On vessels	77,124	38,352,259
On land	32,861	20,772,873
Officers, managers, clerks, etc	8,500	7,865,181
All other	24,361	12,907,692

The salaries and wages paid amounted to $59,125,132. The men employed on the vessels formed 70.1 per cent of all the employees, and their salaries and wages formed 64.9 per cent of the total.

FREIGHT.

The freight received and shipped at the Atlantic and Gulf ports includes three different categories of traffic: (1) That which moves coastwise between the ports of the Atlantic coast and Gulf of Mexico; (2) [*a*] that which is carried in American vessels between these ports and American ports other than those of the Atlantic and Gulf coasts, that is, ports of the Pacific Coast states, Hawaii, and Porto Rico, and [*b*] traffic carried in American vessels between ports of the Atlantic and Gulf coasts and foreign ports; and (3) the imports and exports of foreign trade handled in foreign vessels through the Atlantic and Gulf gateways. The tables compiled by the Census include the first two of these categories; that is, coastwise and intercoast freight movements and the foreign commerce handled in American ships.

The differences between the censuses of 1889 and 1906 have been pointed out in the United States section. The total freight handled at the Atlantic and Gulf ports in 1906 (including harbor traffic) was 140,512,043 tons as compared with a total of 52,712,124 tons in 1889. The limitations to be placed upon this comparison are pointed out in the United States section. It should be remembered that the shipments and receipts of principal commodities by ports in 1906, as stated in Table 31—65,360,958 tons of shipments and the same quantity of receipts—represent the freight moved from port to port and do not include the traffic carried on lighters and barges within the port areas. The quantity of traffic "carried on lighters and barges in and around harbors for all waters except the Great Lakes" in 1906 was estimated at 88,026,046 tons. The enormous barge traffic at New York and the relatively large barge traffic of certain other Atlantic and Gulf ports account for the greater portion of the total for the United States. This readily explains the difference between the total of shipments and receipts—65,360,958 tons—and the total freight carried by all craft employed on the Atlantic and Gulf seaboard in 1906—140,512,043 tons.

Possibly attention should be called to the fact stated in the United States section, that "the figures for the Atlantic coast and the Gulf of Mexico include practically the same class of traffic at both censuses, with the exception of the lighterage or harbor work reported for some ferryboats in 1906; this class of freight was omitted from the statistics for the division at the census of 1889 and was not fully reported for 1906." By keeping in mind this exception and the fact that it was necessary to resort to estimates in determining a part of the traffic included in the figures for freight carried, comparisons may be made between the figures for the total freight carried in 1889 and the figures for 1906. The gain in freight carried during the period was 166.6 per cent.

The commodities shipped at the Atlantic and Gulf ports are shown in Table 30.

TABLE 30.—*Freight shipped, by commodities: 1906.*

COMMODITY.		Quantity.
Canned goods	net tons	193,602
Cement, brick, and lime	net tons	4,738,177
Coal	net tons	19,149,753
Cotton	net tons	793,992
Flour	net tons	104,362
Fruits and vegetables	net tons	796,329
Grain	net tons	530,843
Ice	net tons	1,951,188
Iron ore	net tons	18,465
Lumber	M feet	2,793,742
Naval stores	net tons	373,261
Petroleum and other oils	barrels	16,840,716
Phosphate and fertilizer	net tons	1,187,883
Pig iron and steel rails	net tons	664,758
Stone, sand, etc	net tons	7,391,384
Tobacco	net tons	165,776
Miscellaneous merchandise	net tons	18,580,196

As would be expected, the coal shipments make up the largest single item of traffic. Next in point of tonnage come stone and sand; lumber; and cement, brick, and lime. Petroleum and other oils amounted to 16,840,716 barrels, which are equivalent to 2,670,205 net tons. Among the other large contributors to the total tonnage were ice, with nearly 2,000,000 tons, and phosphate and fertilizer, with over 1,000,000 tons. A large part of the total tonnage—28.4 per cent—consisted of the tonnage of miscellaneous merchandise and of general package freight.

"Many of the managing owners [of vessels] kept no record of the quantities of the different commodities carried and could therefore give only estimates in reply to the Census inquiry." [1] Some of the package freight not being shipped by weight, it became necessary to make estimates of the tonnage. It is, however, believed that as a result of the exercise of special care the figures of freight shipments and receipts presented in this report are approximately accurate.

Had it been practicable to do so, it would have been desirable to show the quantity of freight shipped from the ports of each state bordering on the Atlantic ocean and Gulf of Mexico. The totals by states, however, could not be determined with accuracy, because it was not possible for the Census agents to obtain exact statements of the shipments and receipts for all of the small ports. The best that could be done was for the agents to ascertain the exact tonnage of the traffic handled at each of the principal ports. The coastwise transportation companies furnished the information for each of the principal ports with precision and then supplied the figures for the traffic received and shipped at "all other ports." In order to divide the traffic among the states with strict accuracy it would be necessary to allocate the traffic handled at each of the "all other ports." Inasmuch as the traffic at these "all other ports" amounted to more than one-third of the total for all ports, the statement of the amount of traffic shipped and received at the seaboard of each of these states could be made only with approximate accuracy. In view of these practical difficulties it was deemed best to present the traffic by principal ports only and not by states.

The shipments and receipts of principal commodities in 1906 are stated for each of the principal ports of the Atlantic coast and Gulf of Mexico in Table 31. As this table is restricted to the freight carried in American vessels, the total receipts and shipments necessarily equal each other.

[1] See United States section of this report, page 33.

TABLE 31.—SHIPMENTS AND RECEIPTS OF PRINCIPAL COMMODITIES, BY PORTS: 1906.

PORT.	TOTAL (NET TONS).		CANNED GOODS (NET TONS).		CEMENT, BRICK, AND LIME (NET TONS).		COAL (NET TONS).		COTTON (NET TONS).		FLOUR (NET TONS).	
	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.
Total	65,360,958	65,360,958	193,602	193,602	4,738,177	4,738,177	19,149,753	19,149,753	793,992	793,992	104,362	104,362
Baltimore, Md	3,579,407	1,858,443	49,005	18,640	11,028	21,936	2,274,731	15,026	12,188	51,130	4,546	19
Bangor, Me	255,613	319,546	10	.....	.....	9,799	40	262,981	.....	.....	40	.....
Boston, Mass	887,001	6,533,573	15,156	16,746	2,697	77,707	3,080	4,699,655	48	145,360	1,010	.....
Charleston, S. C	303,950	414,730	610	581	196	42,553	1,059	83,371	62,882	4,056	310	648
Fall River, Mass	274,646	786,392	1,400	1,050	420	2,590	.....	570,438	700	14,900	200	1,430
Galveston, Tex	734,915	960,982	86	14,312	134	13,865	1,795	50,390	137,628	94,278	856	.....
Gulfport, Miss	48,061	346,096	25	27	.....	.....	.....	.....	.....	.....	57	4
Jacksonville, Fla	661,615	331,951	30	457	10	18,154	350	97,356	1,940	.....	150	1,850
Jersey City, N. J	186,982	167,548	.....	.....	19,735	3,428	117,866	3,789	.....	.....	.....	.....
Mobile, Ala	260,725	102,533	736	3,038	591	4,814	1,481	4,863	15,383	22,638	2,536	2
New Bedford, Mass	163,951	581,176	.....	.....	96	.....	2,020	476,879	.....	.....	78	.....
New Haven, Conn	161,666	2,156,814	1,500	10,800	600	3,261	.....	1,830,953	.....	.....	200	8,400
New London, Conn	240,305	887,404	.....	60	2,405	2,280	8,450	592,555	.....	440	.....	55
New Orleans, La	741,621	1,182,863	823	1,056	490	21,355	3,419	12,631	45,459	7,885	16,605	.....
New York, N. Y	8,598,374	17,507,906	46,191	22,880	181,425	3,491,267	943,592	502,345	47,289	359,185	37,537	4,029
Norfolk and Newport News, Va	7,680,230	2,808,346	2,973	29,158	4,265	29,528	4,081,999	102,521	118,695	3,697	4,973	2,907
Pensacola, Fla	56,130	123,632	329	8	134	.....	4,156	4,131	.....	36	1,954	.....
Philadelphia, Pa	5,213,485	2,721,456	2,580	9,563	6,427	3,562	3,784,825	31,911	754	10,983	4,881	95
Port Arthur, Tex	1,052,778	39,363	.....	.....	.....	80	.....	430	.....	.....	.....	.....
Portland, Me	303,295	1,357,316	9,517	1,430	947	8,051	3,138	1,124,065	.....	6,770	1,854	.....
Portsmouth, N. H	25,390	362,820	.....	.....	19,060	.....	6,130	341,261	.....	.....	.....	.....
Providence, R. I	341,524	2,749,511	1,563	3,834	2,060	13,262	849	2,258,375	11,785	31,064	1,952	.....
Rockland, Me	175,904	149,496	2	5	124,641	7,833	1,903	76,270	.....	.....	1,385	.....
Savannah, Ga	907,397	582,906	1,057	16,487	15	24,714	2,701	130,149	150,352	8,171	520	.....
Tampa and Port Tampa City, Fla	372,467	188,692	83	1,155	285	2,062	.....	35,560	.....	.....	844	2,419
Washington, D. C	92,910	599,177	40	1,502	872	2,054	46,962	88,161	.....	.....	20	12
Wilmington, Del	95,241	250,188	50	50	990	25	6,985	2,178	.....	.....	50	200
Wilmington, N. C	121,930	145,209	1,918	207	1,719	16,115	242	8,292	159	3,649	3,523	346
Ports other than those on the Atlantic and Gulf coasts of the United States	1,587,789	2,340,843	501	421	950	18,039	9,004	285,248	149	.....	.....	34,840
All other Atlantic and Gulf ports	30,235,656	16,803,986	57,417	40,135	4,355,985	899,823	7,842,976	5,457,969	188,581	29,750	18,281	47,106

TABLE 31.—SHIPMENTS AND RECEIPTS OF PRINCIPAL COMMODITIES, BY PORTS: 1906—Continued.

PORT.	FRUITS AND VEGETABLES (NET TONS).		GRAIN (NET TONS).		ICE (NET TONS).		IRON ORE (NET TONS).		LUMBER (NET TONS).		NAVAL STORES (NET TONS).	
	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.
Total	796,329	796,329	530,843	530,843	1,951,188	1,951,188	18,465	18,465	6,050,814	6,050,814	373,261	373,261
Baltimore, Md	3,789	58,293	45,616	52,185	732	47,154	1,767	2,450	10,447	503,351	354	22,758
Bangor, Me			156	150	43,046				201,817	1,976		
Boston, Mass	43,311	69,418	2,809	380		600	736		19,383	299,566	162	24,461
Charleston, S. C	220	12,246	1,897	5,911	53				136,941	5,266	3,398	1,308
Fall River, Mass		575	5,490	850	100				3,261	21,288		
Galveston, Tex	64,262	26,262	20,279	3,782	25				19,265	21,779		
Gulfport, Miss	1		292		2				42,703	328,860	100	14,990
Jacksonville, Fla	51,299	95	500	5,074	60				499,865	3,749	46,137	1,737
Jersey City, N. J			26,126		6	1,057		602	583	1,578		
Mobile, Ala	410	890	18,937	501	201				147,566	6,635	1,173	1,992
New Bedford, Mass			80		30	5,714			20,934	17,990		
New Haven, Conn	350	10,450				1,769		750	416	48,230	600	300
New London, Conn		380	379	44	73	1,489			1,496	13,564		
New Orleans, La	15,707	22,079	62,294	50	1,970				55,263	148,176	24	15,475
New York, N. Y	105,927	319,304	97,372	59,560	50	1,758,179	404	824	129,556	2,393,694	7,822	142,724
Norfolk and Newport News, Va	105,675	71,433	4,449	8,977	372	12,330	3,018	636	446,628	122,378	4,796	767
Pensacola, Fla	39		16,907		505				19,658	82,561	1,686	27,257
Philadelphia, Pa	9,528	66,469	47,491	6,069	1,965	36,640	235		9,402	655,017	142	29,551
Port Arthur, Tex		72							33,460	33,253		
Portland, Me	5,455		8,253		9,772			3	31,782	27,788	1,590	720
Portsmouth, N. H					200					231		
Providence, R. I	1,653	6,420	1,410	558	350	5,599			3,103	55,650	5	533
Rockland, Me	4	475	3,845	90	1,451				3,585	11,028	50	
Savannah, Ga	23,144	7,995	2,103	69,066	10				448,930	5,397	105,913	5,947
Tampa and Port Tampa City, Fla	1,632	4,204	2,944	5,858	54	1,716			36,607	1,069	3,812	4,108
Washington, D. C	330	783	8	542	6,800	24,396			1,866	41,452		
Wilmington, Del	100	12,800	25	3,304						6,693		
Wilmington, N. C	70	1,042	4,992	1,919	276	10			62,586	9,834	13,949	10,852
Ports other than those on the Atlantic and Gulf coasts of the United States	101,208	13,840	5,976	123,133		4,436	1,850	741	237,614	288,485		375
All other Atlantic and Gulf ports	262,215	90,804	150,213	182,840	1,883,085	50,099	10,455	12,459	3,426,097	894,276	181,548	67,406

PORT.	PETROLEUM AND OTHER OILS (NET TONS).		PHOSPHATE AND FERTILIZER (NET TONS).		PIG IRON AND STEEL RAILS (NET TONS).		STONE, SAND, ETC. (NET TONS).		TOBACCO (NET TONS).		MISCELLANEOUS MERCHANDISE (NET TONS).	
	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.
Total	2,670,205	2,670,205	1,187,883	1,187,883	664,758	664,758	7,391,354	7,391,354	165,776	165,776	18,580,196	18,580,196
Baltimore, Md	83,921	71,154	251,641	167,285	94,979	22,458	2,022	60,805	1,343	48,142	731,298	695,657
Bangor, Me	34	19,200		2,536		1,450	106	4,655			10,364	16,799
Boston, Mass	9,192	188,442	42,873	12,515	653	32,849	2,853	239,462	244	8,404	742,794	718,008
Charleston, S. C	961	11,338	29,210	30,653			199	28,609	9		66,005	188,190
Fall River, Mass	73	4,450		200		2,950	10,000	12,702		200	253,002	152,769
Galveston, Tex	7,417	39,562	61	1,647	257	161,462	52,003	71,586	402		430,445	462,057
Gulfport, Miss	7	146		1,125					1		4,873	944
Jacksonville, Fla	3,097	15,424	420	4,800		2,212			573		57,184	181,043
Jersey City, N. J	225	90	100	1,501	18,702	1,000	2,950	149,591			689	4,912
Mobile, Ala	99	403	15,612	21,200	20	90	6,286		57	55	49,637	35,412
New Bedford, Mass	80	1,311						2,002			140,633	77,280
New Haven, Conn	191	3,607	370	1,239		37,445		28,682	600	2,000	156,839	168,928
New London, Conn	596	4,905	257	430		20	200	1,950		5	226,449	269,227
New Orleans, La	25,983	73,398	2,827	5,308	1,431	15,403		551,827	560	50	508,766	308,170
New York, N. Y	270,619	692,482	108,585	16,500	265,663	91,584	1,609,264	3,184,477	10,331	88,707	4,736,747	4,390,165
Norfolk and Newport News, Va	4,150	14,215	33,737	181,479	224,485	12,377	1,075	153,210	99,860	5,532	2,539,080	2,057,201
Pensacola, Fla	497		415						37	3	9,813	9,636
Philadelphia, Pa	211,531	414,451	66,390	49,228		42,851	35,592	324,506	517	427	1,031,225	1,040,133
Port Arthur, Tex	1,011,164					2,133					8,154	3,395
Portland, Me	609	14,430	298	2,901	400	2,500	525	32,189	1,545	200	227,610	136,269
Portsmouth, N. H								20,833				495
Providence, R. I	1,991	8,794	471	673	2,950	48,038	3,094	33,014	561	1,811	307,727	281,886
Rockland, Me	830	169	50	25		260	10,936	10,737			27,222	42,604
Savannah, Ga	140	13,250	7,449	44,075	29,303	1,326		55	1,736	638	134,024	255,696
Tampa and Port Tampa City, Fla	420	83,369	273,598			784	1,800	4,770	2	2,916	50,386	38,682
Washington, D. C	17	26,093	367				4,431	296,930			31,197	117,252
Wilmington, Del	2	23,848	200	100			15,507	131,341		75	71,332	69,574
Wilmington, N. C	378	25,282	12,330	21,276				1,434	42		19,746	44,951
Ports other than those on the Atlantic and Gulf coasts of the United States	5,328	139,488	12,023	8,700	4,588	8,529	4,999	2,884	28,407	509	1,175,192	1,411,175
All other Atlantic and Gulf ports	1,030,653	780,904	328,599	612,487	21,327	177,037	5,627,512	2,043,103	18,949	6,102	4,831,763	5,411,686

The total trade carried on between the ports covered by the table was 65,360,958 tons. This table comprises, first of all, the Atlantic and Gulf coastwise movements, and secondly, the relatively small amount of freight traffic between the ports of the Atlantic and Gulf coasts and the ports of Porto Rico, the Pacific coast, Hawaii, and foreign ports. The shipments in the vessels of the Atlantic coast and Gulf of Mexico from ports not on the Atlantic and Gulf coasts amounted to 1,587,789 tons. By taking this sum from the total shipments it is found that the coastwise shipments were 63,773,169 tons. By similar process the coastwise traffic received at the ports of the Atlantic and Gulf coasts is shown to have been 63,020,115 tons.

New York naturally led all other ports both in shipments and in receipts. It is a notable fact, moreover, that the receipts at New York were more than double the shipments from that port. The shipments, however, were much the larger in the case of Norfolk and Newport News, the combined receipts for the two ports being only a little over one-third the shipments. The shipments from Norfolk and Newport News were within a million tons as large as those from New York. For Philadelphia and Baltimore also the discrepancy between shipments and receipts is striking, the shipments being nearly double the receipts. The excess of shipments over receipts at such ports as Norfolk, Newport News, Philadelphia, and Baltimore is mainly accounted for by their large outbound traffic in coal; on the other hand, ports like Boston, Providence, and New Haven receive large shipments of coal coastwise, and also considerable quantities of lumber, the combined tonnages of which readily account for most of their excess of receipts over shipments.

The trade carried on at each of the 28 ports included in the table and the character of their commerce are shown in detail. In the case of Port Arthur, Tex., nearly all of the traffic in 1906 consisted of petroleum and lumber, while in the case of Gulfport, Miss., lumber accounts for most of the traffic in that year. On the other hand, at some ports having only a comparatively small amount of tonnage the traffic comprised almost all the classes of goods enumerated in the table. As instances of such, Wilmington, N. C., and Mobile, Ala., may be mentioned.

TRAFFIC AT AND ABOUT NEW YORK CITY.

While the port of New York alone greatly exceeds all other American ports in the amount of traffic, it is also the center of a much larger volume of traffic. In collecting the statistics, Hoboken, Jersey City, Newark, Perth Amboy, and South Amboy were treated as separate ports. As a matter of fact, the water-borne traffic at each of these ports may properly be considered as part of that handled in and about New York.

Table 32 shows the total receipts and shipments at these five ports and at New York.

TABLE 32.—SHIPMENTS AND RECEIPTS OF PRINCIPAL COMMODITIES AT HOBOKEN, JERSEY CITY, NEWARK, NEW YORK, PERTH AMBOY, AND SOUTH AMBOY: 1906.

COMMODITY.	TOTAL.		HOBOKEN.		JERSEY CITY.		NEWARK.		NEW YORK.		PERTH AMBOY.		SOUTH AMBOY.	
	Shipments (net tons).	Receipts (net tons).	Shipments (net tons).	Receipts (net tons).	Shipments (net tons).	Receipts (net tons).	Shipments (net tons).	Receipts (net tons).	Shipments (net tons).	Receipts (net tons).	Shipments (net tons).	Receipts (net tons).	Shipments (net tons).	Receipts (net tons).
Total	13,651,221	18,437,742	552,348	43,774	186,982	167,548	5,318	315,681	8,598,374	17,507,906	1,463,185	398,883	2,845,014	3,950
Canned goods	46,191	22,880	.....	.....	.....	.....	.....	.....	46,191	22,880	.....	.....	.....	.....
Cement, brick, and lime	232,241	3,889,235	5,070	58	19,735	3,428	2,915	92,696	181,425	3,491,267	5,100	300,250	17,996	1,536
Coal	5,832,927	508,747	546,181	.....	117,806	3,789	.....	2,613	943,502	502,345	1,441,817	.....	2,783,471	.....
Cotton	47,294	359,185	.....	.....	.....	.....	.....	.....	47,289	359,185	5	.....	.....	.....
Flour	37,537	4,029	.....	.....	.....	.....	.....	.....	37,537	4,029	.....	.....	.....	.....
Fruits and vegetables	105,927	319,304	.....	.....	.....	.....	.....	.....	105,927	319,304	.....	.....	.....	.....
Grain	124,063	76,860	585	17,300	26,126	.....	.....	.....	97,372	59,560	.....	.....	.....	.....
Ice	122	1,759,236	66	.....	6	1,057	.....	.....	50	1,758,179	.....	.....	.....	.....
Iron ore	404	1,426	.....	.....	.....	602	.....	.....	404	824	.....	.....	.....	.....
Lumber	131,667	2,462,278	272	786	583	1,578	.....	42,502	129,556	2,393,694	220	22,136	1,036	1,582
Naval stores	7,985	142,724	.....	.....	.....	.....	.....	.....	7,822	142,724	163	.....	.....	.....
Petroleum and other oils	271,022	696,021	.....	.....	225	90	.....	3,449	270,619	692,482	778	.....	.....	.....
Phosphate and fertilizer	110,413	74,528	.....	.....	100	1,501	1,728	.....	108,585	16,500	.....	56,527	.....	.....
Pig iron and steel rails	284,539	92,584	174	.....	18,702	1,000	.....	.....	265,663	91,584	.....	.....	.....	.....
Stone, sand, etc	1,656,574	3,510,688	.....	5,433	2,950	149,591	.....	171,187	1,609,264	3,184,477	7,642	.....	36,718	.....
Tobacco	10,331	88,707	.....	.....	.....	.....	.....	.....	10,331	88,707	.....	.....	.....	.....
Miscellaneous merchandise	4,751,364	4,429,310	.....	20,197	689	4,912	675	3,234	4,736,747	4,380,165	7,460	19,970	5,793	832

The total shipments from the six ports, of which New York is the immediate center, amounted to 13,651,221 tons, as contrasted with 8,598,374 tons for the port of New York proper. Of the five ports about New York, South Amboy led in the total shipments and Perth Amboy came second, facts which are accounted for by the large shipments of coal. Hoboken had shipments amounting to 552,348 tons, nearly all of which consisted of coal. The receipts at these six ports enter mainly through New York. None of the other five ports had receipts amounting to 400,000 tons.

In studying Table 32 the fact should be kept in mind that the statistics presented in it cover only the traffic shipped from and delivered at the ports named in the table. In addition to this, 1,706,131 tons (coal 1,551,991 tons, other freight 154,140 tons) were shipped from, and 30,514 tons were received at, minor ports around New York harbor, and a vast volume of freight was handled by unrigged craft in and about this great port. Data relating to unrigged craft are stated in Table 33.

TABLE 33.—*Unrigged craft operating in and around New York harbor: 1906.*

KIND.	Number of vessels.	Gross tonnage.	Freight lightered (net tons).
Total	5,289	1,470,791	55,131,418
Canal boats	305	47,640	1,338,741
Coal boats	1,859	453,841	14,691,914
All other unrigged	3,125	969,310	39,100,763

It was found impossible to make a strict division between canal boats and coal boats. It often happens that canal boats are used for transporting coal for a large part of the year, and when so used they were classified as coal boats, and not as canal craft. It was also found impossible to segregate closely the statistics of unrigged craft used in the port of New York from the statistics of other vessels engaged in the commerce of New York. This difficulty is illustrated by the fact that a fleet of 20 canal boats was reported as being operated between Philadelphia, Pa., and Newburg, N. Y., as well as between points in New York harbor. This fleet of 20 boats carried 78,434 tons of freight and did lightering work to the amount of 75,133 tons. While it was not possible to ascertain just how much of this lightering was confined to New York harbor, it was thought best to consider the entire fleet as a part of the New York harbor craft. As another instance of the difficulty just noted, reference may be made to the fact that 1 boat made eight trips between Buffalo and New York, and two between Baltimore and New York, and also did lightering to the amount of 2,100 tons within New York harbor. Because of the lightering work done, this boat was assigned to New York. Facts such as these show that the total number and gross tonnage stated in Table 33 probably fully cover the number and tonnage of unrigged craft engaged in New York harbor work.

Table 33 shows 55,131,418 tons of freight to have been lightered in and around New York harbor, and Table 32 shows the shipments from New York and the five adjacent ports to have been 13,651,221 tons, and the receipts 18,437,742 tons, to which is to be added the freight shipments and receipts of the minor ports, 1,706,131 tons and 30,514 tons, respectively. The sum of these, 33,825,608 tons, represented the traffic taken into and out of the harbor area of which New York is the center. This traffic and the freight lightered within the port, 55,131,418 tons, make a total of 88,957,026.

This tonnage, however, does not cover the entire water-borne commerce handled in and about New York. In order to secure that total it is necessary to add the tonnage of the import and export traffic in foreign vessels. Statistics in regard to the import and export trade are published by the Bureau of Statistics of the Department of Commerce and Labor, but these statistics do not give the total tonnage of the imports and exports, although they state the value and to some extent the quantity of the various commodities received and shipped. The exact tonnage of the American imports and exports can not be determined from official statistics.

The imports at New York in 1906 in foreign vessels were valued at $622,890,044 and the exports at $536,068,474, the combined value of imports and exports being $1,158,958,518. The foreign trade carried on at the six ports named in Table 32 is credited by the Bureau of Statistics to three customs districts—New York, Perth Amboy, and Newark. The value of the exports from Perth Amboy and Newark in foreign vessels were $2,306,079 and the imports $8,599,580. By combining these with the corresponding figures for New York, the amounts for the three customs districts in foreign vessels become: Exports, $538,374,553; imports, $631,489,624; total, $1,169,864,177.

In an elaborate investigation made in the years 1899 to 1901 by the Isthmian Canal Commission into the cargo tonnage of American maritime commerce, it was found that the average value of the cargo ton of exports from the Atlantic coast was $35.98, and that the average value of the cargo ton of imports was $62.84. Assuming that the average value per ton of the exports from New York and vicinity in 1906 was $35.98, the tonnage was 14,963,162; and if the average value of the imports be taken as $62.84 per ton, the tonnage of imports at New York, Perth Amboy, and Newark was 10,049,167, making a total tonnage of exports and imports of 25,012,329. This total must be taken only as an approximation, although it is probably a fairly accurate one. By combining this total with the 88,957,026 tons of freight shipped, received, and lightered, the total traffic moved on the waterways at and around New York is found to have been 113,969,355 tons in 1906.

This total represents approximately the amount of freight handled by water in and around New York. It does not, however, for reasons that have already been explained, include the full amount of freight carried by ferryboats. Moreover, it was found impossible to make an exact segregation of the freight carried to and from points that may be considered adjacent to New York as distinguished from freight that was shipped and delivered at nonadjacent points. The factor of uncertainty in this connection is probably not a large one. The only other fact to which attention needs to be called is that the totals given in Table 33 include boats that are operated in and around the harbor of New York during a part of the year and are used elsewhere the remainder of the twelve months. If calculations regarding the harbor work of other large ports were to be made, care would have to be taken to avoid duplication.

FOREIGN COMMERCE HANDLED AT THE ATLANTIC AND GULF PORTS.

Just as, in order to make a complete statement of the freight traffic for the port of New York, it was necessary to show the foreign as well as the domestic trade, so a similar presentation is necessary in the case of other Atlantic and Gulf ports.

TABLE 34.—VALUE OF IMPORTS AND EXPORTS OF MERCHANDISE, BY PRINCIPAL CUSTOMS DISTRICTS, FOR YEAR ENDING JUNE 30, 1906.[1]

CUSTOMS DISTRICT.	AGGREGATE.		IMPORTS.		EXPORTS.	
	Value.	Per cent of group.	Value.	Per cent of group.	Value.	Per cent of group.
Atlantic and Gulf ports	$2,459,047,706	.....	$1,028,546,453	.....	$1,430,501,253	.....
Atlantic ports	2,036,340,868	100.0	974,562,799	100.0	1,061,778,069	100.0
New York, N. Y.	1,341,511,137	65.9	734,350,823	75.4	607,160,314	57.2
Boston and Charlestown, Mass.	205,181,724	10.1	106,442,077	10.9	98,739,647	9.3
Philadelphia, Pa.	153,365,662	7.5	70,801,273	7.3	82,564,389	7.8
Baltimore, Md.	140,009,699	6.9	30,084,653	3.1	109,925,046	10.4
Savannah, Ga.	66,342,620	3.3	1,503,069	0.2	64,839,551	6.1
Newport News, Va.	22,749,651	1.1	2,630,317	0.3	20,119,334	1.9
Wilmington, N. C.	18,970,314	0.9	503,385	0.1	18,466,929	1.7
Portland and Falmouth, Me.	15,918,392	0.8	1,232,928	0.1	14,685,464	1.4
Norfolk and Portsmouth, Va.	12,807,446	0.6	780,231	0.1	12,027,215	1.1
Brunswick, Ga.	12,645,925	0.6	19,853	.....	12,626,072	1.2
All other Atlantic ports	46,838,298	2.3	26,214,190	2.7	20,624,108	1.9
Gulf ports	422,706,838	100.0	53,983,654	100.0	368,723,184	100.0
New Orleans, La.	189,944,308	44.9	39,464,982	73.1	150,479,326	40.8
Galveston, Tex.	171,336,528	40.5	5,018,876	9.3	166,317,652	45.1
Mobile, Ala.	26,575,706	6.3	4,851,326	9.0	21,724,380	5.9
Pensacola, Fla.	18,826,579	4.5	386,457	0.7	18,440,122	5.0
All other Gulf ports	16,023,717	3.8	4,262,013	7.9	11,761,704	3.2

[1] Bureau of Statistics, Department of Commerce and Labor, "Commerce and Navigation of the United States," 1906.

The total value of the imports and exports handled at the Atlantic and Gulf ports amounted to nearly $2,500,000,000, somewhat over two-fifths consisting of imports and somewhat less than three-fifths of exports. The foreign trade of the Atlantic ports comprised 82.8 per cent of the total, and that of the Gulf cities 17.2 per cent. New York so far outranked all other ports that her foreign trade was 65.9 per cent of the total for the Atlantic ports and 54.6 per cent of the total for the Atlantic and Gulf ports. In the import trade New York's leadership was more pronounced than in the export traffic, although more than half of the commodities shipped abroad from the Atlantic ports passed through her port. Boston was second among American ports in foreign trade, with a total value of imports and exports amounting to less than one-sixth that for New York. Philadelphia and Baltimore were third and fourth, respectively, among the Atlantic ports in value of foreign trade, but both ranked lower than New Orleans and Galveston.

Of the Gulf ports, New Orleans held first place in the total value of imports and exports, although the exports of Galveston were of greater value than those of New Orleans. The progress of Galveston during recent years has been rapid, and the city has the prospect of becoming the ranking port on the Gulf.

The place of New Orleans in the import trade of the Gulf is similar to that held by New York in the import commerce of the Atlantic, the imports of New Orleans being valued at 73.1 per cent of the total for the Gulf, and those of New York being valued at 75.4 per cent of the total for the Atlantic.

ENTRANCES AND CLEARANCES OF VESSELS—FOREIGN TRADE OF ATLANTIC AND GULF PORTS.

Statistics of the tonnage of the vessels engaged in foreign commerce at the Atlantic and Gulf ports afford another measure of the magnitude of the foreign trade of the United States. Table 35 shows the total number and tonnage of the vessels entered and cleared in the foreign trade at the Atlantic and Gulf ports and states what percentage of the tonnage was furnished by American vessels. For each of the six largest Atlantic and Gulf ports the facts are shown for steamers and sailing vessels separately. Only 10.8 per cent of the tonnage of the vessels entered was under the American flag, and only 11.1 per cent of the tonnage cleared was American.

TABLE 35.—VESSELS ENTERED AND CLEARED IN THE FOREIGN TRADE, BY PRINCIPAL SEABOARD CUSTOMS DISTRICTS: 1906.[1]

CUSTOMS DISTRICT AND CLASS OF VESSEL.	ENTERED.							CLEARED.						
	Total.		American vessels.		Foreign vessels.		Per cent tonnage of American vessels forms of total.	Total.		American vessels.		Foreign vessels.		Per cent tonnage of American vessels forms of total.
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.		Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.	
Atlantic and Gulf coasts	14,343	24,345,505	2,482	2,630,072	11,861	21,715,433	10.8	14,425	24,131,206	2,582	2,672,794	11,843	21,458,412	11.1
Baltimore, Md.:														
Sailing	80	54,913	50	23,140	30	31,773	42.1	61	27,654	43	16,066	18	11,588	58.1
Steam	768	1,493,677	4	3,452	764	1,490,225	0.2	770	1,584,118	6	6,340	764	1,577,778	0.4
Boston and Charlestown, Mass.:														
Sailing	543	103,465	36	8,543	507	94,922	8.3	623	151,015	93	43,585	530	107,430	28.9
Steam	1,092	2,854,690	108	183,569	984	2,671,121	6.4	841	2,092,317	99	162,869	742	1,929,448	7.8
New York, N. Y.:														
Sailing	866	400,446	246	121,673	620	278,773	30.4	723	373,633	142	85,746	581	287,887	22.9
Steam	3,213	10,076,547	403	1,220,023	2,810	8,856,524	12.1	2,967	9,540,327	424	1,224,344	2,543	8,315,983	12.8
Philadelphia, Pa.:														
Sailing	153	101,188	72	38,696	81	62,492	38.2	196	172,022	116	103,383	80	68,639	60.0
Steam	981	1,979,708	52	69,633	929	1,910,075	3.5	1,023	2,078,615	49	62,779	974	2,015,836	3.0
Galveston, Tex.:														
Sailing	46	36,134	28	25,927	18	10,207	71.7	31	19,786	14	10,202	17	9,584	51.6
Steam	539	1,054,549	13	13,736	526	1,040,813	1.3	640	1,264,323	15	15,575	625	1,248,748	1.2
New Orleans, La.:														
Sailing	32	25,508	6	2,995	26	22,513	11.7	26	20,498	4	1,042	22	19,456	5.1
Steam	910	1,690,498	56	121,333	854	1,569,165	7.2	954	1,819,150	56	124,510	898	1,694,640	6.8

[1] Bureau of Statistics, Department of Commerce and Labor, "Commerce and Navigation of the United States," 1906.

It will be noted, moreover, that with the exception of the clearances from New Orleans the percentage of the tonnage credited to the American vessels was higher for sailing vessels than for steamers in the case of each of the six ports named in Table 35.

The relative rank of the Atlantic and Gulf districts in total of vessels entered and cleared in the foreign trade in 1906 is shown in Table 36. Taking the two districts together the aggregate tonnage of American vessels entered was 2,630,072, the figures for clearances being 2,672,794. The tonnage of all vessels entered at the Atlantic ports formed 79.9 per cent of the total tonnage for the entrances at the Atlantic and Gulf ports, and the clearances of the Atlantic ports were 78.9 per cent of the corresponding aggregate.

TABLE 36.—VESSELS ENTERED AND CLEARED IN THE FOREIGN TRADE: 1906.[1]

DISTRICT AND CLASS OF VESSEL.	ENTRANCES AND CLEARANCES COMBINED.			ENTERED.							CLEARED.						
	Aggregate.		Per cent tonnage of American vessels forms of total.	Total.		American vessels.		Foreign vessels.		Per cent tonnage of American vessels forms of total.	Total.		American vessels.		Foreign vessels.		Per cent tonnage of American vessels forms of total.
	Number.	Tonnage.		Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.		Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.	
Atlantic and Gulf districts	28,768	48,476,711	10.9	14,343	24,345,505	2,482	2,630,072	11,861	21,715,433	10.8	14,425	24,131,206	2,582	2,672,794	11,843	21,458,412	11.1
Atlantic district	21,052	38,486,520	10.9	10,486	19,449,990	1,642	2,030,604	8,844	17,419,386	10.4	10,566	19,036,530	1,878	2,176,894	8,688	16,859,636	11.4
Sailing	6,379	2,104,073	34.5	3,049	966,463	868	281,656	2,181	684,807	29.1	3,330	1,137,610	1,091	444,171	2,239	693,439	33.0
Steam	14,673	36,382,447	9.6	7,437	18,483,527	774	1,748,948	6,663	16,734,579	9.4	7,236	17,898,920	787	1,732,723	6,449	16,166,197	9.7
Gulf district	7,716	9,990,191	11.0	3,857	4,895,515	840	599,468	3,017	4,296,047	12.2	3,859	5,094,676	704	495,900	3,155	4,598,776	9.7
Sailing	1,906	977,122	27.0	1,013	536,977	414	184,505	599	352,472	34.4	893	440,145	282	79,173	611	360,972	18.0
Steam	5,810	9,013,069	9.2	2,844	4,358,538	426	414,963	2,418	3,943,575	9.5	2,966	4,654,531	422	416,727	2,544	4,237,804	9.0

[1] Bureau of Statistics, Department of Commerce and Labor, "Commerce and Navigation of the United States," 1906.

The relation of sail to steam tonnage in the foreign trade of the Atlantic and Gulf ports is brought out clearly in Table 36. In both entrances and clearances for each district the percentage of the tonnage of American vessels was much higher for sailing vessels than for steamers. Of the entrances at Gulf ports and the clearances from Atlantic cities, over 34 per cent of the total tonnage of sailing vessels was American. In the case of steam tonnage, less than one-tenth of the total was American. It is a well-known fact that steamships are steadily supplanting sailing vessels in ocean transportation, and that the American deep-sea marine is gradually being changed from one in which sailing vessels predominate to one in which steamers are mainly employed. The transformation, however, is still incomplete. The sailing vessels are used to a larger extent by Americans than by foreigners. One reason why the registered tonnage of the American marine does not increase more rapidly is to be found in the relatively

large place held in that marine by the sailing vessel, a type of ship that is steadily being abandoned in favor of the steamer.

PASSENGERS.

The total number of passengers carried coastwise on the Atlantic and Gulf increased 71.9 per cent from 1889 to 1906.

TABLE 37.—*Number of passengers: 1906 and 1889.*

CLASS OF PASSENGERS.	1906	1889	Per cent of increase.
Total	292,555,416	170,225,458	71.9
Ferry	272,596,670	158,644,012	71.8
All other	19,958,746	11,581,446	72.3

This traffic consists of two distinct classes of passengers—those carried on the ferries and those carried by passenger steamers operated from port to port. There has been a steady increase in the port to port traffic as the result of the establishment of new lines of coastwise steamers and the development of long-established services, the port to port traffic having risen 72.3 per cent. The great volume of passenger traffic is carried by the ferries. Less than 20,000,000 passengers were carried from port to port in 1906, while the number of ferry passengers was more than 272,000,000.

The United States Steamboat Inspection Service keeps a record of the number of passengers carried on enrolled steamers, and their reports show the passenger traffic centering in each of the principal ports.

TABLE 38.—*Passengers reported for each district of the United States Steamboat Inspection Service on the Atlantic coast and Gulf of Mexico: 1906.*[1]

LOCAL INSPECTION DISTRICT.	Number of passengers.
Total	291,053,505
Albany, N. Y	3,840,186
Apalachicola, Fla	164,716
Baltimore, Md	3,702,873
Bangor, Me	804,230
Boston, Mass	17,665,329
Charleston, S. C	616,782
Galveston, Tex	56,992
Jacksonville, Fla	538,738
Mobile, Ala	175,388
New Haven, Conn	743,999
New London, Conn	1,335,745
New Orleans, La	4,030,718
New York, N. Y	213,575,838
Norfolk, Va	5,964,799
Philadelphia, Pa	32,228,294
Portland, Me	2,372,900
Providence, R. I	2,785,293
Savannah, Ga	450,685

[1] Annual report of the Steamboat Inspector-General.

The total number of passengers reported by the Steamboat Inspection Service in 1906 differs slightly from the total reported by the Census, but the discrepancy is no greater than might be expected as a result of the fact that the information was obtained from various sources and the figures were collected at different times. The great importance of New York as the center of the coastwise passenger traffic is such that, according to the report of the Steamboat Inspector-General, 73.4 per cent of the total for the Atlantic and Gulf coasts is credited to this city in 1906. The enormous traffic centering at New York is made up mainly of ferry passengers, although that city is also the chief center of the port to port passenger business. On account of the ferry traffic across the Delaware river, Philadelphia ranked next to New York in the number of passengers carried, the traffic at this port being 11.1 per cent of the total. Boston came third, with 6.1 per cent, and Norfolk and New Orleans were fourth and fifth, respectively, in volume of traffic.

IDLE VESSELS.

The Census figures for number and tonnage of vessels include only such vessels as were used to some extent during the year 1906. The vessels that were not in service at any time during the year were considered as idle vessels.

TABLE 39.—*Idle vessels: 1906.*

CLASS.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1,074	87,254	$6,895,147
Steam	450	49,131	5,801,871
Sail	475	11,971	780,405
Unrigged	149	26,152	312,871

The idle vessels were mostly small craft, the average tonnage being only 81.2 tons. Over two-fifths of the total number of idle vessels consisted of steamers, the value of which was 84.1 per cent of the total.

VESSELS OPERATED AND TRAFFIC CARRIED BETWEEN PORTO RICAN PORTS.

The data concerning transportation by water in the United States in 1906 do not include the statistics for vessels operated locally at Porto Rico, but Table 40 presents information regarding such vessels and the volume of the local coastwise traffic of the island.

TABLE 40.—*Vessels operating locally at Porto Rico: 1906.*

	Total.	Steam.	Sail.	Unrigged.
Number of vessels	205	4	43	158
Gross tonnage	5,566	94	905	4,567
Value of vessels	$180,519	$29,200	$43,175	$108,144
Gross income	$227,031	$7,600	$42,258	$177,173
Number of employees	603	16	132	455
Wages	$121,533	$5,381	$24,861	$91,291
Number of passengers carried	2,400	.....	2,400	.....
Freight carried (net tons)	24,120	.....	24,120	.....

Commerce between the United States and Porto Rico is now limited by our coastwise laws to American vessels, and the local coastwise traffic of the island is also restricted to American shipping. The local fleet, in

addition to providing transportation for the home markets, collects and distributes the traffic carried by the lines of steamers plying between Porto Rico and the Atlantic ports.

CONGRESSIONAL APPROPRIATIONS.

The appropriations by Congress for the improvement of the rivers and harbors of the Atlantic and Gulf coasts have extended over a period of more than one hundred years. The expenditures have been devoted to a large number of localities and streams, and the list of laws by which the appropriations have been made is lengthy. The total appropriations for each state of the Atlantic slope and coast are shown in Table 41, and for each state of the Gulf slope and coast in Table 42, while the appropriations in detail for each river and harbor are shown in Tables 43 and 44. These tables were compiled from House Document 421, Fifty-seventh Congress, second session, from the report of the Chief of Engineers for the fiscal year ending June 30, 1906, and from the rivers and harbors act of March 2, 1907. They constitute an extremely valuable compilation, showing precisely how the expenditures for the improvement of the Atlantic and Gulf harbors and streams have been distributed.

TABLE 41.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and states.*

LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1802	$141,162,891	$56,448,541	$73,821,826	$10,892,524
Maine	1821	5,832,574	2,715,774	2,791,800	325,000
New Hampshire	1829	710,271	484,560	225,711	.....
Massachusetts	1823	14,619,077	5,093,703	8,479,641	1,045,733
Rhode Island	1827	5,234,433	1,538,950	3,216,149	479,334
Connecticut	1821	5,240,054	2,783,028	2,000,526	456,500
New York	1829	25,454,730	9,771,543	13,327,877	2,355,310
New Jersey	1829	4,184,018	1,913,038	1,433,730	837,250
Pennsylvania	1870	588,000	499,750	88,250	.....
Delaware	1822	6,953,755	3,533,460	3,252,465	167,830
District of Columbia	1849	3,585,500	2,163,500	1,037,000	385,000
Maryland	1828	8,717,313	4,583,813	3,487,990	645,510
Virginia	1829	7,414,000	3,488,380	3,173,566	752,054
North Carolina	1826	6,497,872	4,096,809	1,923,500	477,563
South Carolina	1836	8,730,575	3,035,500	5,392,785	302,290
Georgia	1826	10,590,938	2,884,172	7,097,116	609,650
Florida	1829	5,755,320	1,352,570	3,462,250	940,500
Miscellaneous	1802	21,054,461	6,509,991	13,431,470	1,113,000

TABLE 42.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Gulf of Mexico, by periods and states.*

LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1826	$64,292,362	$21,065,470	$38,027,940	$5,198,952
Georgia	1874	315,456	202,300	88,156	25,000
Florida	1828	4,176,785	939,880	2,764,074	472,831
Alabama	1826	6,124,631	2,264,331	3,410,300	450,000
Mississippi	1827	2,056,207	463,819	1,071,888	520,500
Louisiana	1829	20,583,913	8,508,462	10,619,659	1,455,792
Texas	1852	23,249,419	6,579,902	15,055,688	1,613,829
Miscellaneous	1833	7,785,951	2,106,776	5,018,175	661,000

Of the total amount appropriated for the Atlantic and Gulf improvements, $127,941,242, or 62.3 per cent, has been granted since 1890. As would be expected, the states having the most important harbors have received the largest amounts. New York leads the list with total appropriations of $25,454,730, 61.6 per cent of which has been granted since 1890. The amount received for developing ports along the lengthy seaboard of Texas causes that state to rank next to New York in the amount of public funds appropriated. Considerably over one-half of the total expenditures in Texas have been devoted to providing Galveston with a harbor and channel of approach.

TABLE 43.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and localities.*

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1802	$141,162,891	$56,448,541	$73,821,826	$10,892,524
Maine	1821	5,832,574	2,715,774	2,791,800	325,000
Bagaduce river	1888	28,000	7,000	21,000	.....
Bar Harbor breakwater	1888	220,000	100,000	90,000	30,000
Belfast harbor	1826	62,200	36,200	26,000	.....
Bucksport harbor	1902	20,000	.....	20,000	.....
Camden harbor	1873	82,400	41,000	41,400	.....
Cape Porpoise harbor	1899	126,000	.....	80,000	46,000
Carvers harbor	1896	45,000	.....	45,000	.....
Cathance river	1880	21,000	21,000	.....	.....
Cobscook bay	1836	5,300	5,300	.....	.....
Damariscotta river	1905	5,000	.....	5,000	.....
Georges river	1896	26,000	.....	26,000	.....
Harraseeket river	1890	31,000	10,000	21,000	.....
Isles of Shoals (Gosport harbor)	1821	44,000	14,000	30,000	.....
Kennebec river	1827	641,445	306,445	260,000	75,000
Kennebunk river	1829	88,675	85,175	3,500	.....
Lubeck channel	1879	319,000	169,000	150,000	.....
Machias river	1873	32,000	32,000	.....	.....
Matinicus Island harbor	1852	1,000	1,000	.....	.....
Moosabec bar	1881	114,000	70,000	44,000	.....
Narragaugus river	1871	72,000	49,500	22,500	.....
New harbor	1905	10,500	.....	10,500	.....
Owlshead harbor	1836	17,902	17,902	.....	.....
Penobscot river	1829	506,300	308,300	68,000	130,000
Piscataqua river	1826	8,450	8,450	.....	.....
Pleasant river	1890	3,500	3,500	.....	.....
Portland harbor	1836	1,463,727	622,727	841,000	.....
Richmond Island harbor	1852	120,000	120,000	.....	.....
Rockland harbor	1880	925,500	190,000	735,500	.....
Rockport harbor	1888	15,000	15,000	.....	.....
Royal river	1871	30,000	30,000	.....	.....
Saco river and breakwater	1827	346,775	296,775	50,000	.....
St. Croix river	1867	5,000	5,000	.....	.....
Sasanoa river [1]	1870	108,500	45,500	19,000	44,000
Sullivan Falls and river	1871	50,000	35,000	15,000	.....
Union river	1870	175,000	30,000	145,000	.....
Wells harbor	1872	5,000	5,000	.....	.....
York harbor	1886	57,400	35,000	22,400	.....
New Hampshire	1829	710,271	484,560	225,711	.....
Bellamy river	1888	35,000	20,000	15,000	.....
Cocheco river	1829	311,771	195,060	116,711	.....
Exeter river	1880	54,000	35,000	19,000	.....
Lamprey river	1881	20,000	20,000	.....	.....
Little harbor of refuge	1886	145,000	70,000	75,000	.....
Portsmouth harbor	1879	137,000	137,000	.....	.....
Winnepesaukee Lake	1880	7,500	7,500	.....	.....
Massachusetts	1823	14,619,077	5,093,703	8,479,641	1,045,733
Bass river	1829	20,150	20,150	.....	.....
Beverly harbor	1902	48,500	.....	10,000	38,500
Boston harbor	1825	7,947,947	2,444,196	4,953,751	550,000
Buzzards bay	1905	2,500	.....	2,500	.....
Canapitsit channel	1892	9,800	.....	9,800	.....
Chatham harbor [2]	1890	13,733	5,000	8,733	.....
Cohasset harbor	1902	10,000	.....	10,000	.....

[1] Shown as Bath gut in 1890.
[2] Shown as Stage harbor in 1890.

TABLE 43.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and localities*—Continued.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Massachusetts—Cont'd.					
Dorchester bay and Neponset river	1907	$125,233	.....	.....	$125,233
Duxbury harbor	1836	37,000	$25,000	$12,000	.....
East Dennis breakwater	1852	1,500	1,500	.....	.....
Essex river	1892	30,000	.....	25,000	5,000
Fall River harbor	1874	205,412	30,000	175,412	.....
Gloucester harbor	1823	502,083	46,000	456,083	.....
Hingham harbor	1875	39,000	26,000	3,000	10,000
Hyannis harbor of refuge	1826	198,794	151,932	46,862	.....
Ipswich river	1886	7,500	5,000	2,500	.....
Kingston harbor	1892	10,000	.....	10,000	.....
Little harbor	1905	18,000	.....	18,000	.....
Lynn harbor	1882	291,437	91,000	200,437	.....
Malden river	1882	80,000	10,000	40,000	30,000
Manchester harbor	1888	24,300	7,500	16,800	.....
Marblehead harbor and Holmes hole	1825	1,900	900	1,000	.....
Marthas Vineyard harbor [1]	1829	29,500	24,500	5,000	.....
Merrimac river	1828	375,367	248,867	126,500	.....
Mystic river	1892	155,000	.....	125,000	30,000
Nantucket harbor of refuge	1828	433,335	215,835	175,000	42,500
New Bedford harbor	1836	270,700	53,000	117,700	100,000
Newburyport harbor	1880	398,500	257,500	141,000	.....
Plymouth harbor	1824	280,082	178,582	101,500	.....
Powow river	1888	51,000	8,000	43,000	.....
Provincetown harbor	1826	225,828	190,328	30,500	5,000
Salem harbor	1873	65,000	39,000	26,000	.....
Sandy bay (Rockport harbor of refuge)	1829	1,719,233	519,233	1,100,000	100,000
Scituate harbor	1829	104,680	63,680	41,000	.....
Taunton river	1870	198,000	164,000	34,000	.....
Town river	1896	37,577	.....	37,577	.....
Vineyard Haven harbor	1888	60,000	35,000	25,000	.....
Wareham harbor	1872	96,236	89,000	7,236	.....
Wellfleet harbor	1872	16,000	16,000	.....	.....
Westport harbor and river	1886	3,000	2,000	1,000	.....
Weymouth harbor and river	1890	122,250	10,000	102,750	9,500
Winthrop harbor	1888	9,000	6,000	3,000	.....
Woods Hole channel	1852	344,000	109,000	235,000	.....
Rhode Island	1827	5,234,433	1,538,950	3,216,149	479,334
Block Island harbor of refuge	1870	521,000	375,000	126,000	20,000
Block Island, Great Salt pond	1896	200,000	.....	170,000	30,000
Churches Cove harbor	1827	28,200	28,200	.....	.....
Coasters Harbor island	1890	5,500	5,500	.....	.....
Greenwich Bay harbor	1890	2,000	2,000	.....	.....
Newport harbor	1873	330,300	133,000	112,300	85,000
Pawtucket river	1867	501,584	197,000	169,000	135,584
Point Judith, harbor of refuge	1890	1,650,000	75,000	1,475,000	100,000
Point Judith pond, entrance	1892	20,000	.....	12,000	8,000
Potonomuth river	1881	5,000	5,000	.....	.....
Providence river and harbor	1852	[2] 1,874,549	703,250	1,080,549	90,750
Sakonnet Point harbor	1899	35,000	.....	25,000	10,000
Sakonnet river	1896	40,000	.....	40,000	.....
Warren river	1886	5,000	5,000	.....	.....
Wickford harbor	1873	16,300	10,000	6,300	.....
Connecticut	1821	5,240,054	2,783,028	2,000,526	456,500
Black Rock harbor	1836	72,550	61,550	11,000	.....
Branford harbor	1902	13,000	.....	8,000	5,000
Bridgeport harbor	1836	663,500	260,000	290,500	113,000
Clinton harbor	1882	8,500	6,500	2,000	.....
Connecticut river	1836	729,511	[3] 520,511	164,000	45,000
Coscob harbor and Mianus river	1892	19,000	.....	19,000	.....
Duck Island harbor of refuge	1890	120,202	25,000	95,202	.....
East Norwalk harbor	1907	63,500	.....	.....	[4] 63,500
Fivemile River harbor	1888	103,000	10,000	23,000	[5] 70,000
Greenwich harbor	1896	21,767	.....	21,767	([6])
Housatonic river	1871	272,450	143,500	108,950	20,000
Milford harbor	1872	72,100	47,100	25,000	.....
Mystic river	1890	36,600	10,000	26,600	.....

Shown as Edgartown harbor in 1890.
[2] Includes appropriations for Green Jacket shoal.
[3] Includes appropriations for Saybrook harbor.
[4] Includes appropriations for South Norwalk harbor.
[5] Includes appropriations for harbors at Stamford, Southport, Greenwich, and Westport, and Saugatuck river.
[6] Included with appropriations for Fivemile River harbor.

TABLE 43.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and localities*—Continued.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Connecticut—Continued.					
New Haven harbor	1852	$634,074	$291,000	$333,074	$10,000
New Haven Harbor breakwater	1879	979,000	490,000	389,000	100,000
New London harbor	1880	166,800	19,800	147,000	.....
Norwalk harbor	1829	134,913	83,080	51,833	.....
Southport harbor	1829	48,976	[7] 31,087	17,889	([6])
Stamford harbor	1829	89,211	20,100	69,111	([6])
Stonington harbor	1827	337,454	314,954	22,500	.....
Thames river	1821	527,900	374,300	123,600	30,000
Westbrook harbor	1829	130	[8] 130	.....	.....
West river	1905	38,500	.....	38,500	.....
Westport harbor and Saugatuck river and harbor	1826	32,416	[9] 19,416	13,000	([6])
Wilsons Point harbor	1888	55,000	55,000	.....	.....
New York	1829	25,454,730	9,771,543	13,327,877	2,355,310
Bronx river	1896	79,500	.....	56,500	23,000
Browns creek	1890	36,000	12,000	19,000	5,000
Canarsie Bay harbor	1880	197,500	48,000	24,500	[10] 125,000
East Chester creek	1873	115,500	69,000	40,500	6,000
East river and Hell Gate	1852	5,255,700	4,130,700	[11] 875,000	250,000
Echo Bay and New Rochelle harbor	1878	94,175	65,175	17,000	12,000
Flushing Bay harbor	1879	135,000	105,000	30,000	([12])
Glencove harbor	1888	72,000	35,000	37,000	.....
Great South bay [13]	1890	110,000	15,000	93,000	2,000
Greenport harbor	1882	46,000	35,000	11,000	.....
Harlem river	1875	1,555,000	730,000	675,000	150,000
Hudson river	1834	5,451,745	1,725,538	3,476,207	250,000
Huntington harbor	1872	57,000	32,500	24,500	([12])
Jamaica bay	1892	9,460	.....	9,460	.....
Larchmont harbor	1890	84,000	5,000	65,000	14,000
Mamaroneck harbor	1882	40,000	15,000	25,000	.....
Mattituck harbor	1896	35,000	.....	35,000	([12])
Newtown creek	1880	420,900	142,500	273,400	5,000
New York harbor	1868	10,999,700	2,245,280	7,292,610	[14] 1,461,810
Peconic river	1871	25,000	25,000	.....	.....
Peckskill harbor	1896	31,500	.....	25,500	[15] 6,000
Port Chester harbor	1872	91,500	37,000	48,000	6,500
Port Jefferson harbor	1852	159,100	105,200	53,900	([13])
Rondout harbor	1872	139,300	105,500	33,800	([16])
Sag Harbor harbor	1829	29,650	150	29,500	([12])
Saugerties harbor	1884	105,000	42,000	43,000	20,000
Sheepshead bay	1880	26,000	26,000	.....	.....
Sumpawanus inlet	1881	7,000	7,000	.....	.....
Tarrytown harbor	1905	26,000	.....	10,000	16,000
Wappinger creek	1890	20,500	13,000	4,500	3,000
New Jersey	1829	4,184,018	1,913,038	1,433,730	837,250
Alloway creek	1890	29,000	6,000	18,000	5,000
Atlantic City harbor	1886	5,000	5,000	.....	.....
Cheesequake creek	1880	46,000	40,000	6,000	([17])
Cohansey river	1873	91,800	36,000	.....	55,800
Cold Spring inlet	1907	311,000	.....	.....	311,000
Cooper creek	1896	37,000	.....	37,000	.....
Cranberry inlet	1852	1,000	1,000	.....	.....
Crow shoal	1836	1,000	1,000	.....	.....
Dennis creek	1896	5,000	.....	5,000	.....
Elizabeth river	1879	50,160	32,000	18,160	([17])
Flat Beach	1829	100	100	.....	.....
Goshen creek	1892	17,000	.....	17,000	.....
Keyport harbor	1882	128,475	30,475	30,000	[18] 68,000
Little Egg harbor	1836	23,500	23,500	.....	.....
Manasquan river	1879	[19] 46,000	41,000	5,000	.....
Mantua creek	1882	97,450	3,000	60,000	34,450
Matawan creek	1881	51,120	23,500	27,620	([17])
Maurice river	1882	43,000	43,000	.....	.....
Newark bay	1852	212,000	12,000	.....	200,000
Passaic river	1872	878,750	378,750	447,000	53,000
Raccoon creek	1882	48,000	3,000	30,000	15,000
Rahway river	1879	37,000	37,000	.....	.....
Rancocas river	1881	45,000	30,000	15,000	.....
Raritan bay	1881	562,500	222,500	315,000	25,000
Raritan river	1836	727,213	[20] 585,213	142,000	([17])
Salem river	1871	47,700	14,500	4,200	29,000
Shoal harbor and Compton creek	1890	37,000	5,000	32,000	([17])
Shrewsbury river	1852	379,500	224,500	145,000	10,000

[7] Includes $10,587 shown for Mill river in 1890.
[8] For survey.
[9] Includes $1,000 shown for Cedar Point beach in 1890.
[10] Includes appropriations for harbors at Port Jefferson, Mattituck, Huntington, Flushing Bay, and Sag Harbor.
[11] Includes $40,000 appropriated for Wallabout channel.
[12] Included with appropriation for Canarsie Bay harbor.
[13] Shown as Patchogue river in 1890.
[14] Includes appropriation for two suction dredges.
[15] Includes appropriation for Rondout harbor.
[16] Included with appropriation for Peekskill harbor.
[17] Included with appropriation for Keyport harbor.
[18] Includes appropriations for Elizabeth, Raritan, and South rivers, Cheesequake and Matawan creeks, and Shoal harbor and Compton creek.
[19] Includes $2,000 shown for Squan river in 1890.
[20] Includes $13,963 shown for New Brunswick harbor in 1890.

TABLE 43.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and localities*—Continued.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
New Jersey—Continued.					
South river	1871	$123,000	$91,000	$32,000	[1]
Tuckerton creek	1902	36,000	.....	24,000	$12,000
Woodbridge creek	1879	61,750	19,000	23,750	19,000
Woodbury creek	1882	5,000	5,000	.....	.....
Pennsylvania	1870	588,000	499,750	88,250	.....
Chester creek	1881	6,000	6,000	.....	.....
Frankford creek	1882	12,000	10,000	2,000	.....
Schuylkill river	1870	525,000	438,750	86,250	.....
Susquehanna river, North branch	1880	45,000	45,000	.....	.....
Delaware	1822	6,953,755	3,533,460	3,252,465	167,830
Appoquinimink river	1890	50,500	5,000	32,500	[2] 13,000
Broad Creek river	1880	41,500	25,000	15,000	1,500
Broadkill river	1873	68,330	35,000	.....	33,330
Delaware bay, harbor of refuge	1896	2,239,334	.....	2,239,334	.....
Delaware Bay breakwater	1822	2,833,354	2,653,354	180,000	.....
Delaware Bay ice harbor	1882	25,000	25,000	.....	.....
Indian river	1882	10,000	10,000	.....	.....
Lewes, pier at	1870	386,160	378,500	7,660	.....
Mispillion river	1879	118,650	17,000	61,650	40,000
Murderkill river	1892	40,360	.....	40,360	([3])
St. Jones river [4]	1881	62,150	40,000	19,150	3,000
Smyrna river	1880	72,965	[5] 25,000	45,965	2,000
Wilmington harbor	1836	1,005,452	319,606	610,846	75,000
District of Columbia	1849	3,585,500	2,163,500	1,037,000	385,000
Anacostia river	1890	299,000	20,000	152,000	127,000
Potomac river	1849	[6] 3,286,500	2,143,500	885,000	258,000
Maryland	1828	8,717,313	4,583,813	3,487,990	645,510
Annapolis harbor	1880	10,000	10,000	.....	.....
Baltimore harbor and Patapsco river	1836	[7] 6,602,530	2,911,830	3,184,200	506,500
Battery Island piers	1886	17,775	17,775	.....	.....
Breton Bay harbor [8]	1878	49,500	37,500	12,000	.....
Cambridge harbor	1871	116,358	42,500	13,858	[9] 60,000
Chesapeake and Ohio canal	1828	1,000,000	1,000,000	.....	.....
Chesapeake Bay headwaters	1836	500	500	.....	.....
Chester river	1873	61,847	46,000	15,847	([10])
Choptank river	1880	70,885	45,000	25,885	([10])
Claiborne harbor	1902	16,863	.....	16,863	([10])
Corsica creek	1882	30,000	30,000	.....	.....
Crisfield harbor	1875	75,025	37,318	.....	37,707
Deal Island passage	1881	10,000	10,000	.....	.....
Elk river	1874	83,968	41,500	23,665	18,803
Fairlee creek	1889	10,000	10,000	.....	.....
La Trappe river	1892	9,117	.....	9,117	.....
Manokin river	1890	29,272	7,500	21,772	([10])
Northeast river	1872	20,640	18,000	2,640	.....
Patuxent river	1888	14,000	11,000	3,000	.....
Pocomoke river	1878	35,043	20,500	14,543	([10])
Queenstown harbor	1871	35,606	14,000	21,606	([10])
Rockhall harbor	1896	41,429	.....	41,429	([10])
St. Jeromes creek	1881	26,500	26,500	.....	.....
Susquehanna river	1852	210,890	162,390	28,500	20,000
Tred Avon river	1880	6,000	6,000	.....	.....
Tyaskin creek	1902	10,158	.....	10,158	([10])
Warwick river [11]	1880	23,909	6,000	17,909	([10])
Wicomico river	1872	87,498	60,000	24,998	2,500
Worton harbor	1872	12,000	12,000	.....	.....
Virginia	1829	7,414,000	3,488,380	3,173,566	752,054
Accotink creek	1872	5,000	5,000	.....	.....
Appomattox river	1852	745,830	431,250	264,580	50,000
Aquia creek	1872	33,000	20,500	12,500	.....
Archers Hope river	1881	10,000	10,000	.....	.....
Blackwater river	1878	22,000	14,000	.....	8,000
Cape Charles City harbor	1890	125,000	25,000	75,000	25,000

[1] Included with the appropriation for Keyport harbor.
[2] Includes appropriation for Murderkill river.
[3] Included with appropriation for Appoquinimink river.
[4] Shown as Jones river in 1890.
[5] Included $20,000 shown for Duck creek in 1890.
[6] Includes all appropriations for the improvement of this river.
[7] Includes appropriations for Curtis Bay channel and harbor at Southwest Baltimore (Spring Garden).
[8] Shown as Leonardtown harbor in 1890.
[9] Includes appropriations for Claiborne, Queenstown, and Rockhall harbors, Chester, Choptank, La Trappe, Manokin, Pocomoke and Warwick rivers, and Tyaskin creek.
[10] Included with appropriation for Cambridge harbor.
[11] Shown as Secretary creek in 1890.

TABLE 43.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and localities*—Continued.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Virginia—Continued.					
Carters creek	1902	$19,588	.....	$19,588	([12])
Chickahominy river	1878	29,000	$24,000	5,000	.....
Elizabeth river	1829	85,080	40,080	45,000	.....
Hampton river	1878	22,000	22,000	.....	.....
Hampton roads	1902	237,500	.....	225,000	$12,500
James river	1836	2,645,500	1,375,500	1,070,000	200,000
Jamestown Island	1894	40,000	.....	40,000	.....
Lower Machadoc creek	1892	11,000	.....	11,000	.....
Mattaponi river	1880	36,100	19,300	16,800	([12])
Milford Haven harbor	1899	17,500	.....	17,500	.....
Nandua creek	1896	7,500	.....	7,500	.....
Nansemond river	1873	92,000	57,000	30,000	5,000
Neabsco creek	1881	5,000	5,000	.....	.....
Nomini creek	1873	79,000	42,500	31,500	5,000
Norfolk harbor	1876	[13] 2,166,282	852,500	993,957	319,825
Nottoway river	1880	7,000	7,000	.....	.....
Occoquan creek	1870	58,571	35,000	23,571	([12])
Onancock harbor	1879	20,511	14,000	6,511	.....
Pagan river	1880	20,870	10,000	10,870	.....
Pamunkey river	1880	29,900	18,500	11,400	([12])
Rappahannock river	1852	438,229	217,500	143,000	77,729
Staunton river	1879	52,500	52,500	.....	.....
Totusky river	1880	10,000	10,000	.....	.....
Urbana creek	1879	43,500	21,500	22,000	.....
York river	1880	299,039	158,750	91,289	[14] 49,000
North Carolina	1826	6,497,872	4,096,809	1,923,500	477,563
Albemarle Sound to Atlantic ocean waterway [15]	1852	50,000	50,000	.....	.....
Beaufort harbor	1836	[16] 225,000	180,000	21,000	24,000
Beaufort inlet	1905	[17] 250,000	.....	45,000	205,000
Black river	1886	22,500	3,000	19,500	([18])
Cape Fear river and Northeast branch	1829	4,311,979	2,746,479	1,391,500	[19] 174,000
Cape Lookout, harbor of refuge	1899	5,000	.....	5,000	.....
Contentnia creek	1881	75,000	52,000	21,000	2,000
Edenton harbor and bay	1878	23,000	17,000	6,000	.....
Fishing creek	1890	25,250	10,000	15,250	.....
Lillington river	1881	6,000	6,000	.....	.....
Lockwood Folly river	1890	18,000	5,000	13,000	.....
Mackeys creek	1890	15,000	15,000	.....	.....
Meherrin river	1882	11,000	5,000	.....	6,000
Neuse river	1878	369,500	267,500	72,000	[20] 30,000
New river	1836	[21] 158,000	113,000	28,000	17,000
Ocracoke inlet	1826	238,750	223,750	15,000	.....
Pamlico and Tar rivers	1836	188,063	93,000	83,500	11,563
Pasquotank river	1829	7,080	3,080	4,000	.....
Perquimans river	1876	13,750	2,500	11,250	.....
Roanoke river	1871	241,000	138,000	100,000	3,000
Scuppernong river	1878	25,000	8,000	15,000	2,000
Shallotte river	1907	3,000	.....	.....	3,000
Town creek	1881	9,500	1,000	8,500	.....
Trent river	1879	99,500	55,500	44,000	([22])
Yadkin river	1879	107,000	102,000	5,000	.....
South Carolina	1836	8,730,575	3,035,500	5,392,785	302,290
Ashepoo river	1872	1,300	1,300	.....	.....
Ashley river	1880	5,500	5,500	.....	.....
Beaufort river	1890	33,000	12,500	20,500	.....
Charleston harbor	1852	4,800,200	2,352,200	2,423,000	25,000
Charleston to McClellanville, inland waterway	1902	125,290	.....	50,000	75,290
Clarkes creek and Lynchs river	1888	9,500	5,000	2,500	2,000
Congaree river	1886	437,000	20,000	267,000	[23] 150,000
Edisto river	1882	33,785	26,000	7,785	.....
Georgetown harbor	1836	48,500	36,500	12,000	.....
Great Pedee river	1880	224,000	79,500	124,500	20,000
Little Pedee river	1888	24,700	10,000	14,700	([24])

[12] Included with appropriation for York river.
[13] Includes appropriation for $20,000 for a waterway from Norfolk harbor to Atlantic ocean.
[14] Includes appropriations for Mattaponi and Pamunkey rivers, and Carters and Occoquan creeks.
[15] Shown as Croatan Sound in 1890.
[16] Includes appropriations for waterway between Beaufort and Newbern.
[17] Includes appropriations for waterway from Pamlico sound to Beaufort inlet.
[18] Included with appropriation for Cape Fear river.
[19] Includes appropriation for Black river.
[20] Includes appropriation for Trent river.
[21] Includes appropriations for waterways between Beaufort and New river, and New river and Swansboro.
[22] Included with appropriation for Neuse river.
[23] Includes appropriations for Santee and Wateree rivers, and Estherville-Minim creek canal.
[24] Included with appropriation for Waccamaw river shown under miscellaneous.

TABLE 43.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Atlantic coast, by periods and localities*—Continued.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
South Carolina—Cont'd.					
Mingo creek	1888	$17,300	$10,000	$7,300	
Salkahatchie river	1882	18,000	18,000		
Santee river	1881	314,750	129,750	185,000	(1)
Town creek and Stono river	1870	7,500	7,500		
Wappoo cut	1881	[2]120,500	43,000	77,500	
Wateree river	1881	97,500	60,000	37,500	(1)
Winyah bay	1886	2,412,250	218,750	2,163,500	$30,000
Georgia	1826	10,590,938	2,884,172	7,097,116	609,650
Altamaha river	1881	200,000	80,000	70,000	[3]50,000
Brunswick harbor	1836	891,650	172,500	572,500	146,650
Club and Plantation creeks	1907	20,000			20,000
Darien harbor	1878	[4]271,366	33,000	238,366	
Jekyl creek	1888	24,000	12,500	11,500	
Ocmulgee river	1876	350,500	109,500	216,000	25,000
Oconee river	1878	168,750	70,000	98,750	(5)
Romerly marsh	1882	42,109	42,109		
St. Augustine creek	1879	5,000	5,000		
Savannah harbor	1826	7,999,563	2,204,563	5,495,000	300,000
Savannah river	1880	563,000	155,000	375,000	33,000
Skidaway narrows	1905	55,000		20,000	35,000
Florida	1829	5,755,320	1,352,570	3,462,250	940,500
Biscayne bay	1899	416,500		316,500	100,000
Fernandina harbor	1874	139,000	[6]24,000		115,000
Indian river	1844	86,500	6,500	71,000	9,000
Key West harbor	1882	712,500	92,500	420,000	200,000
Oklawaha river	1835	49,000	20,000	14,000	15,000
Orange river	1902	5,000		2,000	[7]3,000
St. Augustine harbor	1829	104,570	88,570	16,000	
St. Johns river	1852	4,203,250	1,095,000	2,611,750	496,500
Volusia bar	1880	39,000	26,000	11,000	2,000
Miscellaneous	1802	21,054,461	6,509,991	13,431,470	1,113,000
Alexandria canal	1837	300,000	300,000		
Atlantic ocean to Great Lakes, survey	1895	495,000		495,000	
Atlantic ocean to Gulf of Mexico	1826	50,400	50,400		
Chesapeake and Delaware Bay canal	1881	25,000	20,000	5,000	
Chesapeake and Delaware canal	1825	450,000	450,000		
Chesapeake bay and Charleston, S. C.	1837	10,000	10,000		
Chincoteague bay to Delaware bay, inland waterway	1886	193,750	118,750	75,000	
Cumberland Sound	1880	3,387,500	592,500	2,720,000	75,000
Dan river	1880	50,500	50,500		
Delaware river	1802	[8]9,665,841	2,868,841	5,852,000	945,000
Dismal Swamp canal	1826	230,000	230,000		
Dismal Swamp canal and N. C. Sound	1894	5,000		5,000	
Little Narragansett bay	1876	36,000	36,000		
Lumber river	1888	19,000	10,000	9,000	
Nanticoke river	1886	25,000	10,000	13,000	2,000
New river	1876	112,000	112,000		
Norfolk and Albemarle Sound through Currituck Sound	1878	237,900	152,500	82,400	3,000
Norfolk to North Carolina sounds via Pasquotank river	1899	262,870		257,870	5,000
North Landing river	1879	55,500	55,500		
Powcatuck river	1871	175,500	88,600	53,900	33,000
Philadelphia harbor	1888	3,950,000	705,000	3,245,000	
St. Marys to St. Johns river	1828	78,000	78,000		
Savannah to Fernandina	1892	135,000		105,000	30,000
Shenandoah river	1880	17,500	17,500		
Staten Island channel	1874	681,500	216,000	465,500	
Transportation routes to seaboard	1874	210,000	210,000		
Waccamaw river	1880	145,700	77,900	47,800	[9]20,000
General appropriations	1824	50,000	50,000		

[1] Included with appropriation for Congaree river.
[2] Includes appropriations for inland waterway between Charleston and Beaufort.
[3] Includes appropriation for Oconee river.
[4] Includes appropriations for Doboy bar.
[5] Included with appropriation for Altamaha river.
[6] Appropriations for inside passage between Fernandina and St. Johns river.
[7] Includes appropriations for Caloosahatchee river and Charlotte harbor which appear in Table 44.
[8] Includes appropriations for harbors at Newcastle, Port Penn, Chester, Marcushook, and Fort Mifflin.
[9] Includes appropriation for Little Pedee river, South Carolina.

TABLE 44.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Gulf of Mexico, by periods and localities.*

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1826	$64,292,362	$21,065,470	$38,027,940	$5,198,952
Georgia	1874	315,456	202,300	88,156	25,000
Etowah river	1876	1,300	1,300		
Flint river	1874	281,000	175,000	81,000	25,000
Oostanaula and Cossawattee rivers	1874	33,156	26,000	7,156	
Florida	1828	4,176,785	939,880	2,764,074	472,831
Anclote river	1899	20,000		20,000	(1)
Apalachicola Bay harbor	1833	388,850	126,350	177,500	85,000
Apalachicola river	1828	119,750	57,500	37,250	[2]25,000
Blackwater river	1899	20,000		15,000	5,000
Caloosahatchee river	1882	37,100	27,600	9,500	(3)
Carrabelle bar and harbor	1896	129,204		69,204	60,000
Cedar Keys harbor	1872	104,500	104,500		
Charlotte harbor	1881	119,000	48,000	71,000	(3)
Chipola river	1835	20,000	9,000	11,000	(4)
Crystal river	1902	50,000		25,000	[5]25,000
Dredge boats	1899	70,000		70,000	
Hillsboro bay and river	1899	723,350		723,350	
Holmes river	1882	16,000	10,000	4,000	2,000
Kissimmee river	1902	27,221		15,000	12,221
Manatee river	1882	140,052	34,000	35,342	70,710
Ocklocknee river	1833	5,000	5,000		
Pensacola harbor	1878	1,145,957	275,000	770,957	100,000
St. Marks river and harbor	1828	37,530	37,530		
Sarasota bay	1890	55,000	5,000	27,500	22,500
Suwanee river	1839	82,658	56,000	26,658	(1)
Tampa bay	1880	740,013	120,000	620,013	
Yellow river	1839	500	500		
Withlacoochee river	1881	125,100	23,900	35,800	65,400
Alabama	1826	6,124,631	2,264,331	3,410,300	450,000
Alabama river	1878	719,000	185,000	334,000	200,000
Cahaba river	1882	45,000	37,500	7,500	
Mobile bay, harbor, and river	1826	5,316,631	[6]1,997,831	3,068,800	250,000
Tallapoosa river	1882	44,000	44,000		
Mississippi	1827	2,056,207	463,819	1,071,888	520,500
Biloxi bay and harbor	1882	73,000	45,000	19,000	9,000
Bluff creek	1890	1,000	1,000		
Chickasawhay river	1890	23,750	5,000	18,750	(7)
Gulfport-Ship Island harbor channel	1884	261,416	21,194	165,222	75,000
Horn Island pass	1894	145,162		136,162	9,000
Homochitto river	1899	24,000		20,000	4,000
Leaf river	1890	23,000	5,000	18,000	(7)
Noxubee river	1880	62,000	53,000	9,000	
Old Town creek	1882	3,000	3,000		
Pascagoula river and Horn Island harbor	1827	1,093,168	161,500	571,668	[8]360,000
Pearl river	1879	276,711	169,125	74,086	33,500
Ship Island pass	1899	40,000		40,000	
Wolf and Jordan rivers	1907	30,000			30,000
Louisiana	1829	20,583,913	8,508,462	10,619,659	1,455,792
Amite river and Bayou Manchac	1880	42,494	23,800	18,694	(9)
Bogue Chitto	1890	62,000	5,000	23,000	[10]34,000
Calcasieu river and pass	1872	636,500	131,500	480,000	25,000
Chefuncte river and Bogue Falia	1872	18,806	12,500	6,306	(9)
Cortableau bayou	1880	58,700	31,200	27,500	
Delta and passes of the Mississippi river	1829	17,103,606	7,798,062	8,255,544	1,050,000
Franklin - Mermentau inland waterway	1907	89,292			89,292
Johnsons bayou	1899	5,000		2,500	2,500
Lafourche bayou	1852	262,500	132,500	130,000	
Mermentau river	1892	27,915		27,915	[11]
Plaquemine bayou	1888	1,875,000	200,000	1,575,000	100,000

[1] Included with appropriation for Crystal river.
[2] Includes appropriation for Chipola river.
[3] Included with appropriation for Orange river in Table 43.
[4] Included with appropriation for Apalachicola river.
[5] Includes appropriation for Anclote and Suwanee rivers.
[6] Includes appropriation of $18,000 made for Pass au Heron in 1828.
[7] Included with appropriation for Pascagoula river.
[8] Includes appropriations for Chickasawhay and Leaf rivers, and for dredges.
[9] Included with appropriation for Bogue Chitto.
[10] Includes appropriations for Amite, Chefuncte, and Tickfaw rivers, Bayou Manchac, and Bogue Falia.
[11] Included with appropriation for Vermilion bayou.

TABLE 44.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Gulf of Mexico, by periods and localities*—Continued.

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Louisiana—Continued.					
Pontchartrain Lake harbor	1852	$25,000	$25,000		
Tangipahoa river	1872	11,500	11,500		
Teche bayou	1829	251,700	80,700	$41,000	$130,000
Terrebonne bayou	1880	38,800	38,800		
Tickfaw river	1881	14,000	8,000	6,000	[1]
Vermilion bayou	1880	61,100	9,900	26,200	[2] 25,000
Texas	1852	23,249,419	6,579,902	15,055,688	1,613,829
Anahuac channel	1905	6,100		6,100	[3]
Aransas pass and bay	1879	1,296,250	581,250	515,000	200,000
Brazos river	1880	939,243	158,750	595,493	185,000
Brazos-Santiago harbor	1878	253,500	253,500		
Cedar bayou	1890	39,250	18,150	21,100	[3]
Colorado river of Texas	1852	20,000	20,000		
Double Point bayou	1902	6,953		6,953	
Galveston and Brazos canal	1902	69,517		69 517	[3]
Galveston Bay ship channel, Buffalo bayou, and Morgan canal	1872	3,186,247	[4] 877,767	1,908,480	400,000
Galveston harbor	1870	10,523,000	2,778,000	7,445,000	300,000
Galveston harbor to Texas City channel	1899	310,000		250,000	60,000
Galveston sea wall	1904	750,000		750,000	
Inland waterway, Texas coast	1907	133,829			133,829
Neches river	1878	33,000	33,000		
Pass Cavallo harbor and inlet [5]	1876	327,500	327,500		
Port Bolivar channel	1907	50,000			50,000
Rio Grande river	1876	21,735	21,735		
Sabine Pass harbor	1852	3,942,750	1,411,750	2,371,000	160,000
Sabine river	1878	50,000	32,000	18,000	
Sabine and Neches rivers	1899	546,500		546,500	
San Antonio river	1852	1,500	1,500		
Surveys	1852	5,000	5,000		
Trinity river	1852	651,863	60,000	516,863	75,000
West Galveston Bay channel	1892	85,682		35,682	[6] 50,000
Miscellaneous	1833	7,785,951	2,106,776	5,018,175	661,000
Black Warrior, Warrior, and Tombigbee rivers	1872	4,764,162	818,250	3,565,912	380,000
Chattahoochee river	1835	734,650	247,000	337,650	150,000
Choctawhatchee river	1833	203,300	122,500	70,800	10,000
Coosa river	1876	1,656,359	824,026	782,333	50,000
Escambia and Conecuh rivers	1833	165,500	80,000	39,500	46,000
Flint, Ocmulgee, and Chattahoochee rivers	1852	10,000	10,000		
Gulf of Mexico deep water harbor	1889	2,000	2,000		
St. Andrews bay to Bon Secours	1894	3,000	3,000		
Water hyacinths, removal of	1899	246,980		221,980	25,000

[1] Included with appropriation for Bogue Chitto.
[2] Includes appropriation for Mermentau river.
[3] Included with appropriation for West Galveston Bay channel.
[4] Includes $92,317 paid for Morgan cut and canal.
[5] Shown as Matagorda bay in 1890.
[6] Includes appropriations for Anahuac channel, Cedar bayou, and Galveston and Brazos canal.

Louisiana ranks third mainly on account of the cost of improving the mouth of the Mississippi river, for which work over $17,000,000 have been spent. The appropriations made for the ports and streams of Massachusetts aggregate $14,619,077. The sums expended in Pennsylvania seem especially small, but it will be seen that the appropriations for the Philadelphia harbor, $3,950,000, and for the Delaware river, $9,665,841, are not included in the Pennsylvania appropriations shown in Table 43.

The improvement of Boston harbor has cost $7,947,947 and about $5,500,000 have been spent on the Hudson river improvement. About $11,000,000 have been devoted to New York harbor, not including $5,255,700 used upon the East river and Hell Gate and $1,555,000 spent on the Harlem river. These three appropriations, which do not include all the money actually used in improving the port of Greater New York, amount to $17,810,400. For the construction of the breakwater and harbor of refuge at the mouth of the Delaware, $5,072,688 have been spent. In addition to this, the Delaware improvements to date, as stated above, have cost $9,665,841.

The improvements made in Virginia have been mainly upon the James river and Norfolk harbor, to which two objects $4,811,782 have been given. Two-thirds of the amount received by North Carolina has been spent upon the Cape Fear river and the Northeast branch. Over one-half of the money used in South Carolina has been devoted to Charleston harbor, which has cost $4,800,200. Over four-fifths of the appropriations received for the harbors and ports of Georgia has been used in dredging the Savannah river and harbor. The larger part of Florida's Atlantic coast appropriations has been spent upon the St. Johns river, for the purpose of giving Jacksonville ready access to the sea. Of the numerous ports of Florida, Pensacola harbor has received the greatest amount. The appropriations made for the improvement of the Alabama harbors and waterways have been used mainly in Mobile bay and harbor and in improving the Black Warrior, Warrior, and Tombigbee rivers. The improvements at Mobile have cost $5,316,631, and the expenditure to date upon the Black Warrior, Warrior, and Tombigbee rivers is $4,764,162. In the case of all of these improvements the appropriations have been made mainly since 1890.

Of the relatively small total appropriation made to improve the harbors of the state of Mississippi, over one-half has been required for the Pascagoula river and Horn Island harbor. In the case of Louisiana, 83.1 per cent of the total appropriations was devoted to improving the delta and passes of the Mississippi river. About 45.3 per cent of the appropriations for the Texas harbors has been given to Galveston, but nearly $4,000,000 have been spent upon Sabine pass, and $1,296,250 have been required by the Aransas pass and bay.

CONCLUSION.

The figures presented in this section show clearly that the American coastwise marine on the Atlantic and the Gulf of Mexico has made large progress since the census of 1889 was taken. In the service performed, both in the transportation of passengers and in the movement of freight, large gains have been made. This progress is certain to continue and there are evidences that the future growth will be more rapid than

the past has been. Until recent years most of the American coastwise traffic has been handled by sailing vessels, mainly schooners. Although this type of craft has been highly efficient, it is much inferior to the modern steamer as a carrier of passengers and freight. The steamer is being substituted for the sailing vessel, because of the increasing importance put upon the movement of traffic in accordance with definite time schedules. Modern business organization places an increasing value upon time. This is true not only for the passenger and package freight services but also for the movement of bulk cargo, such as lumber and coal. Nearly all of the heavy coal traffic now moved from Norfolk and Philadelphia to New York and New England ports is handled in barges, towed by powerful ocean-going tugs, each tug taking two or three barges.

The rapidity with which the steamer and the barge are taking over the coastwise traffic is illustrated by Mr. William Barclay Parsons in a paper recently published.[1] He states that "in 1902 there arrived in Boston from domestic ports south of Cape Cod 1,033 steamers, 1,209 sailing vessels, 909 tugs, and 1,879 barges; total, 5,030. In 1906, four years later, there were 1,148 steamers, 900 sailing vessels, 1,166 tugs, and 2,458 barges; total, 5,672. The aggregate vessel tonnage of the former year was a little over 5,000,000 tons, and of the latter nearly 7,000,000 tons." These figures show a decrease in the sailing vessels of 25.6 per cent and an increase in barges of 30.8 per cent. There was a relatively small increase in the number of steamers, but the increase in steam tonnage was much larger than the gain in the number of ships would show. In 1902 the total of all entrances at Boston, including both coastwise and foreign traffic, was divided among four classes of vessels as follows: Steamers, 20.5 per cent; sailing vessels, 24 per cent; tugs, 18.1 per cent; and barges, 37.4 per cent. In 1906 the percentages were: Steamers, 20.2; sailing vessels, 15.9; tugs, 20.6; and barges, 43.3. Thus during this period of four years the percentages of sailing vessels declined from 24 to 15.9, while the proportion of barges rose from 37.4 per cent to 43.3 per cent of the total. It is not to be inferred from this statement that the sailing vessel may be expected to disappear from the American merchant marine; it will be used with profit in minor traffic services for a long time to come—possibly it will always be the most economical carrier for some kinds of traffic.

The growing volume of coastwise traffic, the steady substitution of steamers for sailing vessels, and the annual congestion of rail traffic during the autumn months of the year have brought about a strong agitation for the further improvement of the harbors of the Atlantic coast and the Gulf of Mexico and for their connection, as far as practicable, by a chain of inland waterways which will reduce the distance between ports and lessen the risk of loss of life and property incurred in navigating the open sea. The passage from New York to Boston and that around Cape Hatteras are especially dangerous, and annually heavy sacrifices of ships and human lives are made. Humanitarian motives, military reasons, and commercial advantages unite in emphasizing the importance of increasing the safety and facility of the coastwise traffic of the Atlantic and Gulf coasts. So far as it is technically possible and financially practicable, the improvement of these facilities may be expected to accompany the progress of American industry and commerce.

[1] Paper on "Cape Cod Canal," in volume on American Waterways. This volume constitutes the Annals of the American Academy of Political and Social Science, January, 1908, Vol. XXXI, page 90.

TABLE 45.—ALL VESSELS, BY CLASS,

	CLASS, OCCUPATION, AND OWNERSHIP.	Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
1	Aggregate	20,032	4,851,421	4,186,451	4,858	370	183	2	1,712,382	45,932	64
2	Steam	5,413	1,457,894	972,320	4,858	370	183	2	1,712,382	45,932	64
3	Freight and passenger	1,523	1,045,811	704,560	1,225	194	104	.....	992,963	10,214	.....
4	Tugs and other towing vessels	1,690	148,992	90,021	1,606	11	73	.....	381,051	1,506	.....
5	Ferryboats	270	162,834	113,531	111	156	1	2	158,140	195	.....
6	Yachts	1,577	70,461	45,228	1,573	1	3	.....	142,203	30,706	56
7	All other	353	29,796	18,980	343	8	2	.....	38,025	3,311	8
8	Individual	2,625	130,963	86,571	2,531	25	68	1	221,280	37,490	56
9	Freight and passenger	492	37,838	27,390	439	15	38	.....	28,994	5,784	.....
10	Tugs and other towing vessels	455	20,236	12,075	426	2	27	.....	51,539	854	.....
11	Ferryboats	25	1,874	1,344	17	6	1	1	2,557	46	.....
12	Yachts	1,463	67,540	43,120	1,461	.....	2	.....	135,951	28,591	56
13	All other	190	3,475	2,642	188	2	.....	.....	2,239	2,215	.....
14	Firm	580	48,015	30,402	542	12	25	1	75,146	3,866	.....
15	Freight and passenger	170	27,528	18,055	145	10	15	.....	20,967	1,827	.....
16	Tugs and other towing vessels	300	17,407	10,109	291	.....	9	.....	48,237	245	.....
17	Ferryboats	4	199	134	2	1	.....	1	180	12	.....
18	Yachts	74	1,717	1,267	74	.....	.....	.....	4,937	1,468	.....
19	All other	32	1,164	837	30	1	1	.....	825	314	.....
20	Incorporated company	2,072	1,244,283	832,971	1,668	315	89	.....	1,354,536	4,221	8
21	Freight and passenger	845	977,868	657,452	628	167	50	.....	938,305	2,583	.....
22	Tugs and other towing vessels	911	107,183	65,061	867	7	37	.....	267,805	407	.....
23	Ferryboats	216	141,424	99,238	78	138	.....	.....	129,890	137	.....
24	Yachts	36	1,133	800	34	1	1	.....	1,090	614	.....
25	All other	64	16,675	10,420	61	2	1	.....	17,446	480	8
26	Miscellaneous	136	34,633	22,376	117	18	1	.....	61,420	355	.....
27	Freight and passenger	16	2,577	1,663	13	2	1	.....	4,697	20	.....
28	Tugs and other towing vessels	24	4,166	2,776	22	2	.....	.....	13,470	.....	.....
29	Ferryboats	25	19,337	12,815	14	11	.....	.....	25,513	.....	.....
30	Yachts	4	71	41	4	.....	.....	.....	225	33	.....
31	All other	67	8,482	5,081	64	3	.....	.....	17,515	302	.....
32	Sail	5,920	1,132,905	1,012,197	.....	.....	.....	.....	.....	.....	.....
33	Freight and passenger	4,227	1,105,901	987,398	.....	.....	.....	.....	.....	.....	.....
34	Yachts	1,358	21,046	19,317	.....	.....	.....	.....	.....	.....	.....
35	All other	335	5,958	5,482	.....	.....	.....	.....	.....	.....	.....
36	Individual	4,091	338,536	298,495	.....	.....	.....	.....	.....	.....	.....
37	Freight and passenger	2,552	315,669	277,501	.....	.....	.....	.....	.....	.....	.....
38	Yachts	1,269	20,038	18,367	.....	.....	.....	.....	.....	.....	.....
39	All other	270	2,829	2,627	.....	.....	.....	.....	.....	.....	.....
40	Firm	1,189	349,135	308,791	.....	.....	.....	.....	.....	.....	.....
41	Freight and passenger	1,082	347,648	307,450	.....	.....	.....	.....	.....	.....	.....
42	Yachts	75	754	704	.....	.....	.....	.....	.....	.....	.....
43	All other	32	733	637	.....	.....	.....	.....	.....	.....	.....
44	Incorporated company	558	399,761	363,782	.....	.....	.....	.....	.....	.....	.....
45	Freight and passenger	542	398,702	362,807	.....	.....	.....	.....	.....	.....	.....
46	Yachts	8	150	149	.....	.....	.....	.....	.....	.....	.....
47	All other	8	909	826	.....	.....	.....	.....	.....	.....	.....
48	Miscellaneous	82	45,473	41,129	.....	.....	.....	.....	.....	.....	.....
49	Freight and passenger	51	43,882	39,640	.....	.....	.....	.....	.....	.....	.....
50	Yachts	6	104	97	.....	.....	.....	.....	.....	.....	.....
51	All other	25	1,487	1,392	.....	.....	.....	.....	.....	.....	.....
52	Unrigged	8,699	2,260,622	2,201,934	.....	.....	.....	.....	.....	.....	.....
53	Canal boats	663	103,877	101,195	.....	.....	.....	.....	.....	.....	.....
54	All other	8,036	2,156,745	2,100,739	.....	.....	.....	.....	.....	.....	.....
55	Individual	1,801	374,565	367,606	.....	.....	.....	.....	.....	.....	.....
56	Canal boats	311	46,040	45,053	.....	.....	.....	.....	.....	.....	.....
57	All other	1,490	328,525	322,553	.....	.....	.....	.....	.....	.....	.....
58	Firm	1,080	268,855	261,601	.....	.....	.....	.....	.....	.....	.....
59	Canal boats	33	4,960	4,906	.....	.....	.....	.....	.....	.....	.....
60	All other	1,047	263,895	256,695	.....	.....	.....	.....	.....	.....	.....
61	Incorporated company	5,711	1,602,171	1,557,705	.....	.....	.....	.....	.....	.....	.....
62	Canal boats	319	52,877	51,236	.....	.....	.....	.....	.....	.....	.....
63	All other	5,392	1,549,294	1,506,469	.....	.....	.....	.....	.....	.....	.....
64	Miscellaneous	107	15,031	15,022	.....	.....	.....	.....	.....	.....	.....
65	Canal boats	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
66	All other	107	15,031	15,022	.....	.....	.....	.....	.....	.....	.....

OCCUPATION, AND OWNERSHIP: 1906.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).	
Iron.	Steel.	Wood.	Composite.		Freight.	Passengers.	All other.					
414	734	18,827	57	$273,105,915	$83,890,161	$25,643,332	$50,226,431	77,124	$38,352,259	292,555,416	65,360,958	1
385	608	4,388	32	193,926,327	57,803,325	25,601,845	32,039,317	45,388	24,433,617	292,292,820	19,340,893	2
156	239	1,123	5	121,136,485	48,644,095	18,185,239	5,418,472	25,177	11,773,117	19,508,104	19,109,272	3
140	183	1,363	4	25,894,551	9,152,820	29,693	21,272,061	11,276	7,528,564	188,046	222,540	4
61	66	143	.....	19,970,466	.....	7,386,913	3,184,621	2,388	2,098,540	272,596,670	.....	5
9	98	1,449	21	21,290,339	.....	.....	16,040	5,068	2,016,936	.....	.....	6
19	22	310	2	5,634,486	6,410	.....	2,148,123	1,459	1,016,460	.....	9,081	7
37	121	2,446	21	27,444,680	1,663,148	647,556	3,622,365	9,732	4,305,969	3,945,453	1,177,705	8
8	7	477	.....	2,958,232	1,530,518	477,689	291,367	2,238	860,968	1,637,188	1,166,646	9
19	16	420	.....	3,162,964	131,220	5,830	3,046,947	2,198	1,345,830	16,698	6,178	10
1	2	22	.....	232,450	.....	164,037	28,234	81	41,515	2,291,567	.....	11
9	96	1,338	20	20,628,509	.....	.....	14,935	4,921	1,959,421	.....	.....	12
.....	.....	189	1	462,525	1,410	.....	240,882	294	98,215	.....	4,881	13
25	21	533	1	4,588,052	1,260,186	121,250	4,071,578	2,726	1,663,160	1,984,184	578,752	14
7	7	156	.....	1,431,524	828,734	102,359	183,425	835	358,952	1,142,406	575,533	15
18	12	270	.....	2,549,525	431,452	2,616	3,735,188	1,690	1,165,863	4,178	3,219	16
.....	.....	4	.....	30,900	.....	16,275	5,800	14	8,143	837,600	.....	17
.....	2	71	1	469,380	.....	.....	985	79	29,277	.....	.....	18
.....	.....	32	.....	106,723	.....	.....	146,180	108	100,925	.....	.....	19
301	440	1,322	9	155,819,420	54,869,075	24,170,421	23,688,955	31,919	17,375,127	266,162,014	17,575,890	20
140	224	476	5	116,387,729	46,273,927	17,563,353	4,881,289	21,979	10,483,658	16,311,396	17,358,547	21
100	148	659	4	19,233,812	8,590,148	21,247	14,240,553	7,245	4,894,544	167,170	213,143	22
56	58	102	.....	17,240,669	.....	6,585,821	2,887,415	2,029	1,615,853	249,683,448	.....	23
.....	.....	36	.....	170,750	.....	.....	.....	80	25,148	.....	.....	24
5	10	49	.....	2,786,460	5,000	.....	1,679,398	586	355,924	.....	4,200	25
22	26	87	1	6,074,175	10,916	662,618	656,419	1,011	1,089,361	20,201,169	8,546	26
1	1	14	.....	359,000	10,916	41,838	62,391	125	69,519	417,114	8,546	27
3	7	14	.....	948,250	.....	.....	249,073	143	122,327	.....	.....	28
4	6	15	.....	2,466,447	.....	620,780	263,172	264	433,029	19,784,055	.....	29
.....	.....	4	.....	21,700	.....	.....	120	8	3,090	.....	.....	30
14	12	40	1	2,278,778	.....	.....	81,663	471	461,396	.....	.....	31
24	52	5,820	24	37,520,903	19,542,231	24,926	474,858	18,654	6,687,314	22,128	18,637,842	32
22	35	4,168	2	33,213,849	19,541,366	23,126	284,690	16,374	6,016,394	20,688	18,630,901	33
2	17	1,317	22	3,775,743	.....	.....	2,681	1,835	524,374	.....	.....	34
.....	.....	335	.....	531,311	865	1,800	187,487	445	146,546	1,440	6,941	35
6	18	4,044	23	13,245,424	6,613,206	23,156	362,668	9,775	2,888,624	20,063	5,232,701	36
4	1	2,545	2	9,342,066	6,612,406	21,356	208,798	7,771	2,324,841	18,643	5,225,815	37
2	17	1,229	21	3,656,627	.....	.....	1,231	1,770	510,648	.....	.....	38
.....	.....	270	.....	246,731	800	1,800	152,639	234	53,135	1,440	6,886	39
4	1	1,183	1	10,437,943	7,006,244	1,770	63,426	5,258	2,135,143	2,045	5,051,644	40
4	1	1,077	.....	10,292,227	7,006,179	1,770	38,360	5,167	2,114,265	2,045	5,051,589	41
.....	.....	74	1	99,016	.....	.....	1,450	42	8,735	.....	.....	42
.....	.....	32	.....	46,700	65	.....	23,616	49	12,143	.....	55	43
13	26	519	.....	12,110,296	5,040,502	.....	38,630	2,975	1,397,248	.....	8,056,034	44
13	26	503	.....	12,022,396	5,040,502	.....	37,532	2,924	1,377,142	.....	8,056,034	45
.....	.....	8	.....	13,000	.....	.....	.....	11	3,956	.....	.....	46
.....	.....	8	.....	74,900	.....	.....	1,098	40	16,150	.....	.....	47
1	7	74	.....	1,727,240	882,279	.....	10,134	646	266,299	.....	297,463	48
1	7	43	.....	1,557,160	882,279	.....	.....	512	200,146	.....	297,463	49
.....	.....	6	.....	7,100	.....	.....	.....	12	1,035	.....	.....	50
.....	.....	25	.....	162,980	.....	.....	10,134	122	65,118	.....	.....	51
5	74	8,619	1	41,658,685	6,544,605	16,561	17,712,256	13,082	7,231,328	240,468	27,382,223	52
.....	.....	663	.....	1,112,475	606,427	.....	337,125	652	281,599	.....	1,104,209	53
5	74	7,956	1	40,546,210	5,938,178	16,561	17,375,131	12,430	6,949,729	240,468	26,278,014	54
2	.....	1,798	1	4,767,831	1,528,013	6,300	2,296,367	2,113	991,032	123,650	3,947,210	55
.....	.....	311	.....	451,550	418,494	.....	135,879	320	154,955	.....	582,887	56
2	.....	1,487	1	4,316,281	1,109,519	6,300	2,160,488	1,793	836,077	123,650	3,364,323	57
.....	.....	1,080	.....	4,610,777	1,520,413	.....	1,799,146	1,601	750,978	.....	4,615,268	58
.....	.....	33	.....	46,800	47,873	.....	9,070	34	15,180	.....	118,496	59
.....	.....	1,047	.....	4,563,977	1,472,540	.....	1,790,076	1,567	735,798	.....	4,496,772	60
3	74	5,634	.....	31,587,058	3,496,179	10,261	11,823,380	8,846	4,869,830	116,818	18,819,745	61
.....	.....	319	.....	614,125	140,060	.....	192,176	298	111,464	.....	402,826	62
3	74	5,315	.....	30,972,933	3,356,119	10,261	11,631,204	8,548	4,758,366	116,818	18,416,919	63
.....	.....	107	.....	693,019	.....	.....	1,793,363	522	619,488	.....	.....	64
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65
.....	.....	107	.....	693,019	.....	.....	1,793,363	522	619,488	.....	.....	66

PACIFIC COAST

PACIFIC COAST.

By Frank L. Sanford.

The maritime history of the section of the country including the 3 states bordering on the Pacific ocean, and the territory of Alaska, covers a much shorter period than that of the sections bordering on the Atlantic ocean, the Gulf of Mexico, and the Great Lakes. California did not become a state until 1850; Oregon was admitted in 1859, and Washington in 1889; and the territory of Alaska was formally organized in 1884.

The peculiar conditions pertaining to an industry in which vessels ply at regular or irregular intervals between the ports of the several states, or between those ports and other parts of the world, render it impossible to definitely assign these craft, the income from their operation, the freight, wages, etc., to any particular state. This section of the report, therefore, will present the details of transportation by water for the Pacific coast as a whole, together with certain features as to seaboards, rivers, etc.

The few harbors on the Pacific coast are unexcelled in their natural advantages, and there is probably no harbor in the country, all things considered, the equal of that of San Francisco. Although the true harbors are not numerous, there are roadsteads and many ports that offer safe anchorages under certain conditions.

The navigation laws and suggestions for the advancement of the merchant marine of the country form no part of these statistics, and yet the conditions governing transportation by water on the Pacific coast are of too much importance to be passed without briefly directing attention to the extensive coast line, the great tributary rivers draining the rich inland territory, the great natural wealth of the states in agricultural, forest, and mineral products, and particularly the position of vantage with regard to the vast field of commercial development on the Pacific ocean. Within the last year seven or eight of the few American steamers engaged in trans-Pacific trade have been withdrawn from that service, and when this fact is considered in connection with the tremendous advance of the country as a whole in other directions, more especially in facilities for transportation on land, it does not appear that sufficient advantage has been taken of the opportunities for maritime commerce or a proper appreciation entertained of its necessity in connection with other branches of industry.

The surplus products of the agricultural and manufacturing branches of industry are increasing in volume, and if they are not exported, a curtailment of these industries must follow. In order that transportation by water may be made satisfactorily available, however, it seems necessary that the same general principles shall be applied to it as to transportation by land.

In the days of American maritime supremacy, before the Pacific coast was a factor in the country's merchant marine, a great business was carried on in the sail trading plan of sending ships out with cargoes to be sold or exchanged for others, and although the days of these traders have passed, the economy connected with the operation of the sailing vessel will probably always insure for that class of craft a certain character of freight. The conditions at present governing commercial intercourse, however, demand the opportunity for the purchase and sale of merchandise, or the renewal of depleted stocks, at frequent intervals, for which reason the steamer must displace the sailing vessel wherever such conditions exist and trade is to be retained. Business conditions, therefore, seem to make necessary for the Pacific coast, regular sailings at as frequent intervals as trade conditions will permit, and by steamers of the highest speed that can be made a source of profitable investment as a commercial enterprise.

GENERAL ANALYSIS.

Before presenting these statistics it should be explained that the freight carried by the merchant marine for the censuses of 1906 and 1889 has been reported by the ton of 2,000 pounds, which is not wholly satisfactory for all purposes of comparison, since it permits of little discrimination between the transportation of a ton of sand or stone and a ton of the most valuable commodity. It is impossible to obtain a true per ton basis of the relative importance of the various commodities carried, because, in addition to the fact that neither the value of the freight nor the number of miles it was carried could be secured, the income was obtainable only as a total for all commodities. It is also impracticable to distinguish the vessels costing little to build and operate from those of the other extreme by the number of tons of cargo carried.

TABLE 1.—ALL VESSELS AND CRAFT: 1906 AND 1889.[1]

[Vessels operating as connecting links in railroad systems did not uniformly report the tonnage of freight carried or income for the year. In addition to the craft reported in this table there were 252 vessels, with a gross tonnage of 28,229, reported as idle in 1906, and 123, with a gross tonnage of 12,067, reported as idle, untraceable, or lost prior to or during 1889.]

	TOTAL.			STEAM.[2]			SAIL.[3]			UNRIGGED.		
	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels	2,537	1,635	55.2	1,066	465	129.2	666	681	[4]2.2	805	489	64.6
Gross tonnage	977,687	419,157	133.3	518,107	160,293	223.2	305,283	195,508	56.1	154,297	63,356	143.5
Value of vessels	$76,622,633	$21,824,040	251.1	$60,440,145	$14,767,355	309.3	$11,533,171	$6,231,340	85.1	$4,649,317	$825,345	463.3
Gross income	$48,520,139	$19,872,738	144.2	$40,220,388	$12,959,914	210.3	$8,299,751	$6,912,824	20.1	[5]	[5]	.....
Number of employees	20,142	11,315	78.0	15,661	6,682	134.4	4,481	4,633	[4]3.3	[5]	[5]	.....
Wages	$12,950,399	$5,880,421	120.2	$10,230,828	$3,567,226	186.8	$2,719,571	$2,313,195	17.6	[5]	[5]	.....
Number of passengers carried	44,189,971	15,672,093	182.0	44,187,184	15,672,093	181.9	2,787	.....	.....	.....	.....	.....
Freight carried, including harbor work (net tons)[6]	17,622,816	11,249,927	56.6	14,173,599	8,488,101	67.0	3,449,217	2,761,826	24.9	[5]	[5]	.....

[1] The 1906 totals include all vessels operating chiefly on the Pacific coast, but the 1889 totals do not include 10 steamers and 86 sailing vessels registered in Atlantic coast ports, but engaged wholly or partially in business on the Pacific coast.
[2] Includes all craft propelled by machinery.
[3] Includes schooner barges, scow schooners, etc.
[4] Decrease.
[5] Included in statistics for steam vessels.
[6] Logs towed in rafts were not reported as freight in 1906; in 1889 an attempt was made to include such freight, but to what extent is uncertain. Harbor work in 1906 amounted to 4,321,523 tons, of which 4,309,678 tons were reported for steam and unrigged vessels, and 11,845 for sail vessels; in 1889 it amounted to 2,431,564 tons, all of which was reported for railroad ferryboats.

The number of vessels increased considerably between 1889 and 1906, but the percentage of gain in number is not one-half that for tonnage, which fact indicates an increase in the size of the vessels in 1906. The largest increase in number of vessels was for steam craft, which gained 601, or 129.2 per cent; the number of unrigged craft increased 316, or 64.6 per cent; while sailing vessels actually decreased 15, or 2.2 per cent. The increase in tonnage was as follows: Steam, 357,814 tons, or 223.2 per cent; sail, 109,775 tons, or 56.1 per cent; and unrigged, 90,941 tons, or 143.5 per cent.

An estimate placed upon the valuation of a vessel is so dependent upon extraneous conditions, which are in a sense apart from the vessel, that it was practically impossible to fix upon any uniform measure which would insure that all would be reported on the same basis. Valuation, therefore, by itself and as compared with tonnage must always be to some extent misleading, since, for instance, the owner of an old vessel engaged in a profitable business would value her much higher than he would a similar vessel that made but few sailings and those of an unprofitable character. Of the three leading features, however, which may be said to describe the fleet, that of value shows the largest percentage of gain, the actual increase amounting to $54,798,593, or 251.1 per cent. Of this increase, $45,672,790, or 83.3 per cent, was for steam vessels; $5,301,831, or 9.7 per cent, was for sailing vessels; and $3,823,972, or 7 per cent, was for unrigged craft.

The number of employees does not show an increase proportionate to the increase in wages. This may be due to a difference in the methods of securing statistics at the two censuses, since in 1889 the schedule was somewhat different from that used in 1906. The instructions for the latter census provide that the board of crews should be included with the wages, but there is no certainty that such was the case in 1889, and this fact alone would account for some part of the disproportionate increase of wages over the number of employees. It must not be overlooked, however, that many of the vessels were in operation only a part of the year, and while a crew of the same size would be necessary whether for a month or a year, the total wages paid might be for a period of several weeks or for twelve months; hence the figures presented would not furnish a fair basis for a computation to show average annual earnings.

The gross income increased $28,647,401, or 144.2 per cent, $27,260,474, or 95.2 per cent of which was earned by steam and unrigged vessels, and $1,386,927, or 4.8 per cent, by sailing craft. The income reported by steam craft was considerably augmented by the addition thereto of the income for unrigged vessels. This combination of data was frequently unavoidable, as no separate report of income was obtainable for barges and other unrigged craft which were towed by tugs of the same ownership. In such cases, therefore, although the freight carried on the barges was credited to the unrigged craft, the income was reported for the towing vessels.

The number of passengers carried shows the large increase of 28,517,878, or 182 per cent. All but 2,787 of these passengers were carried on steam vessels.

The amount of freight carried, exclusive of harbor work, shows a gain of 4,482,930 tons, or 50.8 per cent. Of the increase, 3,807,384 tons, or 84.9 per cent, was credited to the steam and unrigged vessels, and 675,546 tons, or 15.1 per cent, to the sailing vessels. Of the total freight, 9,863,921 tons, or 74.2 per cent, was carried by steam and unrigged vessels, and 3,437,372 tons, or 25.8 per cent, by sailing vessels in 1906, as compared with 6,056,537 tons, representing 68.7 per cent, and 2,761,826 tons, or 31.3 per cent, for the two classes of vessels, respectively, in 1889. The conclusions as to freight, however, in this comparative table

are misleading, because the freight carried by unrigged vessels has been included with that for steamers, in order to make these items comparable with the figures for 1889, at which census freight for unrigged craft was not reported separately in full.

In 1906 the freight carried by steamers and unrigged vessels was reported separately and, exclusive of freight classed as harbor work, was as follows: Steamers, 6,685,007 tons, or 50.3 per cent; unrigged craft, 3,178,914 tons, or 23.9 per cent.

TABLE 2.—ALL VESSELS AND CRAFT, BY OCCUPATION, AND PER CENT IN EACH GROUP: 1906.

OCCUPATION.	VESSELS.		TONNAGE.		VALUE OF VESSELS.		GROSS INCOME.		EMPLOYEES.		WAGES.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Number.	Per cent.	Amount.	Per cent.
Total	2,537	100.0	977,687	100.0	$76,622,633	100.0	$48,520,139	100.0	20,142	100.0	$12,950,399	100.0
Commercial vessels	2,316	91.3	972,687	99.5	75,759,329	98.9	48,417,140	99.8	19,924	98.9	12,821,952	99.0
Freight and passenger	1,151	45.4	754,068	77.1	63,440,563	82.8	37,969,854	78.3	16,379	81.3	9,964,556	76.9
Ferryboats	47	1.9	40,171	4.1	4,315,522	5.6	4,208,430	8.7	759	3.8	708,777	5.5
Tugs and other towing vessels	313	12.3	24,151	2.5	3,353,927	4.4	3,305,938	6.8	1,548	7.7	1,248,065	9.6
Unrigged craft	805	31.7	154,297	15.8	4,649,317	6.1	[1] 2,932,918	6.0	[1] 1,238	6.1	[1] 900,534	7.0
Yachts	170	6.7	2,524	0.3	468,910	0.6	2,600	(2)	94	0.5	45,161	0.3
All other	51	2.0	2,476	0.3	394,394	0.5	100,399	0.2	124	0.6	83,286	0.6

[1] In many cases the income, employees, and wages for unrigged craft were not reported separately, but were included in the reports for towing vessels.
[2] Less than one-tenth of 1 per cent.

Of the Pacific coast fleet, the vessels used for commercial purposes formed 91.3 per cent of the total number, and their tonnage formed 99.5 per cent of the total tonnage. Although these percentages really represent the vessels engaged in the freight and passenger service, a further segregation has been made, which presents statistics for vessels of the several specific types or classes. Those classed as freight and passenger are in every respect the most important, representing over three-fourths of the total tonnage, value, income, wage-earners, and wages reported for all vessels. Most of the business of the freight and passenger class is the transportation of freight. In fact, these and the unrigged craft are credited with practically the whole of the freight tonnage. The unrigged craft represented almost one-third of the total number of vessels reported, but their proportions of the other items shown in Table 2 are much smaller. In this connection it is proper to state that while the unrigged craft have always been credited with the full amount of freight they carried, in many instances the income, number of employees, and wages have been credited to the towing steamers when both were of the same ownership. Tugs and towing vessels are a special type, but they are so closely related and so essential to the freight and passenger and the unrigged vessels, that they are looked upon as a part of those fleets, and it is unsatisfactory to consider separately several of the items connected with their statistics. The tugboats represented but 2.5 per cent of the total tonnage, this being the smallest proportion for any of the four classes of commercial vessels. Ferryboats are a distinct class, largely engaged in the transportation of passengers, although the ferryboats owned by railroad companies also convey cars as a part of their service. The 47 vessels of this class, while forming but 1.9 per cent of the number of all classes and 4.1 per cent of the tonnage, reported 8.7 per cent of the total income. The 170 yachts formed 6.7 per cent of the total number of all vessels, but for none of the other items contained in the table did their proportion reach 1 per cent. The "all other," or miscellaneous, vessels embraced dredges, pilot boats, water boats, craft used for scientific purposes, and various other vessels not specifically covered by the other classifications.

Steam craft represented more than two-fifths of the number, over one-half of the tonnage, and more than three-fourths of the value of all vessels. The freight and passenger class represented more than one-half of the number of all steam vessels, and almost seven-eighths of the tonnage and value of such vessels. Tugs and other towing vessels are usually of small tonnage; hence, while the number of these vessels formed almost three-tenths of the total number of the steam craft, they constituted less than one-twentieth of their tonnage. These conditions are reversed in the case of ferryboats, although the difference in the proportions is not so great. Yachts and all other craft were comparatively unimportant as to tonnage and value.

TABLE 3.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND OCCUPATION: 1906.

CLASS AND OCCUPATION.	VESSELS.			TONNAGE.			VALUE OF VESSELS.		
	Number.	Per cent of total.	Per cent of class.	Gross tons.	Per cent of total.	Per cent of class.	Amount.	Per cent of total.	Per cent of class.
Total	2,537	100.0	.....	977,687	100.0	.....	$76,622,633	100.0	.....
Steam	1,066	42.0	100.0	518,107	53.0	100.0	60,440,145	78.9	100.0
Freight and passenger	604	23.8	56.7	451,270	46.2	87.1	52,164,977	68.1	86.3
Tugs and other towing vessels	313	12.3	29.4	24,151	2.5	4.7	3,353,927	4.4	5.5
Ferryboats	47	1.9	4.4	40,171	4.1	7.8	4,315,522	5.6	7.1
Yachts	66	2.6	6.2	1,065	0.1	0.2	294,800	0.4	0.5
All other	36	1.4	3.4	1,450	0.1	0.3	310,919	0.4	0.5
Sail [1]	666	26.3	100.0	305,283	31.2	100.0	11,533,171	15.1	100.0
Freight and passenger	547	21.6	82.1	302,798	31.0	99.2	11,275,586	14.7	97.8
Yachts	104	4.1	15.6	1,459	0.1	0.5	174,110	0.2	1.5
All other	15	0.6	2.3	1,026	0.1	0.3	83,475	0.1	0.7
Unrigged	805	31.7	100.0	154,297	15.8	100.0	4,649,317	6.1	100.0

[1] Includes 9 schooner barges of 9,077 tons.

In connection with these statistics the following statement, shown by Lloyd's Register, 1907–8, is of interest, since it gives the number and tonnage of such steamers on the Pacific coast, in 1889 and in 1906, of American registry, which had a sustained speed of twelve knots and over:

SUSTAINED SPEED.	NUMBER.			GROSS TONNAGE.		
	Total.	1906	1889	Total.	1906	1889
Total	48	31	17	208,298	163,706	44,592
18 knots	2	2	.....	22,560	22,560	.....
17 knots	5	5	.....	24,320	24,320	.....
16 knots	4	2	2	33,594	27,278	6,316
15½ knots	3	3	.....	7,382	7,382	.....
15 knots	3	1	2	5,865	824	5,041
14½ knots	4	2	2	27,327	22,333	4,994
14 knots	8	4	4	23,264	8,860	14,404
13¼ knots	1	.....	1	1,264	.....	1,264
13 knots	5	3	2	23,185	17,433	5,752
12½ knots	5	2	3	7,730	3,471	4,259
12 knots	8	7	1	31,807	29,245	2,562

There was a gain of 14, or 82.4 per cent, in the number of these vessels and 119,114, or 267.1 per cent, in their tonnage. It is a noticeable fact that in but three of the eleven classes were there more vessels in 1889 than in 1906, and in the two classes of greatest speed, 17 and 18 knots, there were none in 1889, while 7 are shown for 1906.

The following list further describes these vessels, and it is significant of their importance to state that 3 of those named, the *Minnesota*, *Manchuria*, and *Mongolia* are the largest vessels of the merchant marine of this country:

List of steamers on the Pacific coast having a sustained speed of 12 knots and over.

NAME.	Sustained speed.	When built.	Gross tonnage.
Korea	18 knots	1901	11,276
Siberia	18 knots	1901	11,284
China	17 knots	1889	5,060
Indianapolis	17 knots	1904	765
Sierra	17 knots	1900	5,989
Sonoma	17 knots	1900	6,253
Ventura	17 knots	1900	6,253
Alameda	16 knots	1883	3,158
Manchuria	16 knots	1903	13,639
Mariposa	16 knots	1883	3,158
Mongolia	16 knots	1904	13,639
Chippewa	15½ knots	1900	996
Iroquois	15½ knots	1901	1,109
President	15½ knots	1906	5,217
City of Puebla	15 knots	1881	2,624
Dolphin	15 knots	1892	824
Santa Rosa	15 knots	1884	2,417
Jefferson	14½ knots	1904	1,615
Minnesota	14½ knots	1904	20,718
Queen	14½ knots	1882	2,728
State of California	14½ knots	1878	2,266
City of Para	14 knots	1878	3,532
City of Peking	14 knots	1874	5,060
City of Seattle	14 knots	1890	1,411
Columbia	14 knots	1890	2,722
Cottage City	14 knots	1890	1,885
Peru	14 knots	1892	3,528
Spokane	14 knots	1901	2,036
Umatilla	14 knots	1881	3,070
Pomona	13¼ knots	1888	1,264
City of Sydney	13 knots	1875	3,017
Nebraskan	13 knots	1902	4,409
Nevadan	13 knots	1902	4,409
Newport	13 knots	1880	2,735
Texan	13 knots	1902	8,615
City of Topeka	12½ knots	1884	1,057
Corona	12½ knots	1888	1,492
George W. Elder	12½ knots	1874	1,710
Ramona	12½ knots	1902	1,061
Senator	12½ knots	1898	2,410
American	12 knots	1900	5,591
Californian	12 knots	1900	5,707
Col. E. L. Drake	12 knots	1903	4,205
Delhi	12 knots	1906	986
Hawaiian	12 knots	1901	5,597
Maverick	12 knots	1890	1,561
Montara	12 knots	1881	2,562
Oregonian	12 knots	1901	5,598

The freight vessels of the sailing fleet constituted more than four-fifths of the total number of sailing craft, and were credited with almost all of the tonnage and value of such craft.

The unrigged craft formed nearly one-third of the number of vessels of all classes, about one-sixth of the tonnage, and about one-sixteenth of the value.

Various types of sailing vessels were reported at the census of 1906:

TYPE.	Number of sail vessels.	Gross tonnage.
Total	666	305,283
Schooners	443	140,156
Barks	49	65,546
Ships	34	60,681
Barkentines	46	35,904
Brigs	3	1,101
Sloops	73	962
Brigantines	2	706
Yawls	13	199
Other craft	3	28

Of the 666 sailing vessels, 66.5 per cent were schooners, having a tonnage of 45.9 per cent of the total tonnage of sail craft. The schooner is specially adapted to the coastwise trade, because of the deck load capacity not practicable on vessels that are ship-rigged. Schooners have another advantage over ships in that they do not require such large crews and are less expensive to operate. The schooner, however, is not restricted to coastwise business, but is found also in the foreign trade, and there is claimed for the schooner *Solano* a record run, in 1902, from China to Port Townsend in twenty-three days. The first three-masted schooner constructed on the Pacific coast was built in 1875; the first four-masted, in 1886; and the first five-masted, in 1896. There is no record of a schooner of more than five masts having been built on the Pacific coast.

There were 34 ships reported, with a total tonnage of 60,681, or 19.9 per cent of the tonnage of all sailing vessels. This type of vessel seems destined soon to become a thing of the past, as none has been built in the United States during recent years and their usefulness is limited. Of barks and barkentines, there were 95, with a tonnage of 101,450, or 33.2 per cent of the total tonnage for sailing vessels. The remaining 94 sailing vessels, consisting of sloops, yawls, brigs, brigantines, and other craft were unimportant, representing a total of but 2,996 tons, or 1 per cent of the total sail tonnage.

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RAILWAY SHIPPING.

A considerable number of vessels were operated as connecting links in railway systems.

TABLE 4.—*Craft operated in connection with steam railroads: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels	88	38	50
Gross tonnage	51,419	38,188	13,231
Value of vessels	$4,492,663	$4,259,328	$233,335
Number of employees	788	733	55
Wages	$744,070	$696,223	$47,847
Number of passengers carried	35,996,163	35,996,163	

This fleet was chiefly employed in San Francisco bay. There were 29 ferryboats and 9 towing vessels comprising the steam part of the fleet. The number of passengers carried by these railroad ferries represents 81.5 per cent of the total number of passengers reported by all vessels on the Pacific coast. The unrigged craft embraced car floats, barges, dredges, pile drivers, etc., that were used in connection with the steam vessels and were more or less necessary to their operation.

GOVERNMENT VESSELS.

The vessels owned and operated by states and municipalities are shown in Table 5.

TABLE 5.—*Vessels owned and operated by state and city governments: 1906.*

	Total.	Steam.	Sail.	Unrigged.
Number of vessels	31	10	1	20
Gross tonnage	3,988	1,463	54	2,471
Value of vessels	$688,728	$269,000	$4,000	$415,728
Gross income	$184,747	$2,000		$182,747
Number of employees	199	62	4	133
Wages	$160,636	$62,106	$190	$98,340
Number of passengers carried	1,156,000	1,156,000		

This fleet is composed of 3 boats owned and operated as a free ferry by the city of Portland, Oreg., and a large variety of other vessels, such as dredges, pile drivers, scows, and fire boats. The number of passengers shown in this table are those carried by the free ferry of Portland.

FERRYBOATS.

The full extent of the ferry business upon the Pacific coast as compared with that for the United States for 1889 and 1906 is shown in Table 6.

TABLE 6.—FERRYBOATS: 1906 AND 1889.

	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	GROSS INCOME. Total.	Passengers.	All other sources.	Number of employees.	Wages.	Number of passengers carried.
United States	1906	536	261,073	$29,578,380	$17,291,073	$10,414,106	$6,876,967	4,519	$3,537,180	330,737,639
	1889	456	146,104	10,442,750	(1)	(1)	(1)	(1)	(1)	182,033,991
Per cent of increase		17.5	78.7	183.2						81.7
Pacific coast	1906	47	40,171	4,315,522	4,208,430	2,037,580	2,170,850	759	708,777	39,532,354
	1889	38	24,630	979,300	994,476	(1)	(1)	478	395,157	14,291,859
Per cent of increase		23.7	63.1	340.7	323.2			58.8	79.4	176.6
Per cent of United States	1906	8.8	15.4	14.6	24.3	19.6	31.6	16.8	20.0	12.0
	1889	8.3	16.9	9.4						7.9

[1] Not reported separately.

In 1889 the statistics for ferryboats were not complete in many of the details reported in 1906, hence comparative figures are lacking in several particulars. For such items as were reported at both censuses it is found that, except for gross tonnage, the percentages of increase for the Pacific coast were in excess of those for the United States as a whole. The class of boats added to the fleet since the census of 1889 appears to have been of a large and expensive type, since the increase in number was but 23.7 per cent, while the increase in tonnage was 63.1 per cent, and the increase in valuation was 340.7 per cent. The income shows an increase of $3,213,954, or 323.2 per cent. In 1906 the income was very evenly divided between the amount received for passenger service and that derived from other sources. Most of the income from all other sources than passengers was that reported by boats operated in connection with railroad ferries and consisted largely of income from loaded and unloaded cars. The freight was classed as lighterage, as the cars were ferried from shore to shore and the freight which they contained was undisturbed in transit. The number of passengers increased 25,240,495, or 176.6 per cent. A comparison of the statistics for the Pacific coast with similar items for the entire country shows the proportions for the Pacific coast to be about as follows: Number of vessels, one-twelfth; tonnage, one-sixth; valuation, one-seventh; gross income, one-fourth; number of employees, one-sixth; wages, one-fifth; and number of passengers, one-eighth. The exact percentages are contained in Table 6.

FISHING CRAFT.

Statistics concerning vessels engaged in the fisheries were taken at the census of 1889, but they were not secured in 1906, because at a later date a special census of the fisheries is to be taken, which will be of a more comprehensive character than would have been practicable if the fisheries were covered by a general inquiry.

TABLE 7.— *Vessels engaged in the commercial fisheries and the persons employed thereon.*[1]

	Pacific coast, 1904.	Alaska, 1905.
Fishing vessels:		
Number	87	3
Tonnage (net)	7,637	148
Value	$506,400	$21,000
Value of outfit	$289,897	$8,000
Transporting vessels:		
Number	139	167
Tonnage (net)	2,745	65,552
Value	$477,600	$2,735,807
Value of outfit	$68,055	(2)
Persons employed:		
On fishing vessels	1,205	
On transporting vessels	401	583

[1] Compiled from the reports of the Bureau of Fisheries.
[2] Not reported.

The statistics are somewhat meager and fail to indicate the extent and importance of the fisheries on the Pacific coast. The fisheries for Alaska present an anomaly that might be misleading to those unfamiliar with the prevailing conditions in that section. The extensive fisheries of that territory show but 3 vessels of 148 tons engaged in fishing, although 167 vessels of 65,552 tons were used to transport the fish, supplies, etc. This may be explained by the great extent of the so-called station fishing, which is carried on from shore stations in numerous small boats, and no doubt most of the persons employed in taking fish are station fishermen, whose catch must be transported to canneries or other markets.

OWNERSHIP OF VESSELS.

A comparison of ownership for steam and sail vessels with the statistics for 1889 limits the presentation to but two classes—incorporated companies and all other forms of ownership combined.

TABLE 8.—OWNERSHIP FOR STEAM AND SAIL VESSELS: 1906 AND 1889.

CLASS AND OWNERSHIP.	VESSELS.				TONNAGE.				VALUE OF VESSELS.			
	Number.		Per cent of total.		Gross tons.		Per cent of total.		Amount.		Per cent of total.	
	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889
Total	1,732	1,146	100.0	100.0	823,390	355,801	100.0	100.0	$71,973,316	$20,998,695	100.0	100.0
Steam and sail:												
Incorporated company	796	281	46.0	24.5	637,571	164,398	77.4	46.2	61,426,691	12,313,110	85.3	58.6
All other forms of ownership	936	865	54.0	75.5	185,819	191,403	22.6	53.8	10,546,625	8,685,585	14.7	41.4
Steam	1,066	465	100.0	100.0	518,107	160,293	100.0	100.0	60,440,145	14,767,355	100.0	100.0
Incorporated company	609	221	57.1	47.5	477,815	127,498	92.2	79.5	55,560,485	11,575,605	91.9	78.4
All other forms of ownership	457	244	42.9	52.5	40,292	32,795	7.8	20.5	4,879,660	3,191,750	8.1	21.6
Sail	666	681	100.0	100.0	305,283	195,508	100.0	100.0	11,533,171	6,231,340	100.0	100.0
Incorporated company	187	60	28.1	8.8	159,756	36,900	52.3	18.9	5,866,206	737,505	50.9	11.8
All other forms of ownership	479	621	71.9	91.2	145,527	158,608	47.7	81.1	5,666,965	5,493,835	49.1	88.2

The growth and importance of corporate ownership are evident from a comparison of the data relative to the tonnage and the valuation of the two classes of ownership for 1889 and for 1906. The number of vessels of corporate ownership was less than the number of those of all other forms in 1889 and also in 1906, but the percentages were more nearly equal at the later census. The tonnage for corporations represented less than one-half of the total tonnage in 1889 and more than three-fourths in 1906. The value of vessels of corporate ownership increased from less than five-eighths in 1889 to about seven-eighths in 1906. Corporate ownership of the steam fleet, which represented somewhat less than one-half of the number of vessels in 1889, had increased to more than one-half in 1906; but for tonnage and value this class of ownership had increased to such an extent in 1906 as to make all other forms of ownership of comparative insignificance, the actual proportions in 1906 being 92.2 per cent and 91.9 per cent, respectively.

The number of sailing vessels was less in the "all other" class in 1906 than in 1889, and with a reduced percentage, but corporate ownership claimed slightly more than one-half of the tonnage and value at the later census, notwithstanding the fact that more than 80 per cent of each of these last two items was reported for the "all other" forms of ownership in 1889.

TABLE 9.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND BY CHARACTER OF OWNERSHIP, WITH PER CENT OF TOTAL AND PER CENT OF CLASS: 1906.

CLASS AND OWNERSHIP.	VESSELS.			TONNAGE.			VALUE OF VESSELS.		
	Number.	Per cent of total.	Per cent of class.	Gross tons.	Per cent of total.	Per cent of class.	Amount.	Per cent of total.	Per cent of class.
Total	2,537	100.0	100.0	977,687	100.0	100.0	$76,622,633	100.0	100.0
Individual	806	31.8	.....	119,565	12.2	.....	6,585,265	8.6	.....
Firm	275	10.8	.....	73,131	7.5	.....	3,678,325	4.8	.....
Incorporated company	1,404	55.3	.....	770,404	78.8	.....	65,235,015	85.1	.....
Miscellaneous	52	2.0	.....	14,587	1.5	.....	1,124,028	1.5	.....
Steam	1,066	42.0	100.0	518,107	53.0	100.0	60,440,145	78.9	100.0
Individual	320	12.6	30.0	23,015	2.4	4.4	2,912,260	3.8	4.8
Firm	121	4.8	11.4	14,084	1.4	2.7	1,599,400	2.1	2.6
Incorporated company	609	24.0	57.1	477,815	48.9	92.2	55,560,485	72.5	91.9
Miscellaneous	16	0.6	1.5	3,193	0.3	0.6	368,000	0.5	0.6
Sail	666	26.3	100.0	305,283	31.2	100.0	11,533,171	15.1	100.0
Individual	366	14.4	55.0	85,227	8.7	27.9	3,455,600	4.5	30.0
Firm	99	3.9	14.9	51,721	5.3	16.9	1,934,565	2.5	16.8
Incorporated company	187	7.4	28.1	159,756	16.3	52.3	5,866,206	7.7	50.9
Miscellaneous	14	0.6	2.1	8,579	0.9	2.8	276,800	0.4	2.4
Unrigged	805	31.7	100.0	154,297	15.8	100.0	4,649,317	6.1	100.0
Individual	120	4.7	14.9	11,323	1.2	7.3	217,405	0.3	4.7
Firm	55	2.2	6.8	7,326	0.7	4.7	144,360	0.2	3.1
Incorporated company	608	24.0	75.5	132,833	13.6	86.1	3,808,324	5.0	81.9
Miscellaneous	22	0.9	2.7	2,815	0.3	1.8	479,228	0.6	10.3

Corporate ownership controlled over one-half of the total number, over three-fourths of the tonnage, and about seven-eighths of the value of all the vessels of the Pacific coast. Individual ownership was second in importance, with about one-third of the number of vessels, almost one-eighth of the tonnage, and more than one-twelfth of the value. Firms represented about one-tenth of the number, and were credited with even smaller proportions of the tonnage and the value. Those vessels which could not properly be placed with

any of the three classes named have been grouped as of miscellaneous ownership. They are unimportant, forming but 2 per cent of the total number and 1.5 per cent of the tonnage and value.

Over one-half of the steam craft, with more than nine-tenths of the tonnage and the value of all steam vessels, were controlled by corporations. The importance of this form of ownership is further illustrated by the fact that such ownership of steamers represented about one-half of the tonnage of all classes of vessels on the Pacific coast and about three-fourths of their total value. In fact, corporate ownership predominated also in sail and unrigged vessels, with the single exception that the number of sail vessels of individual ownership was nearly double that of corporate ownership. Of the three main groups of ownership, that of firms was the least important, when considered as to its totals for all classes of ownership and also for each of the three classes of vessels.

NUMBER AND TONNAGE OF VESSELS.

Of the total number of vessels, 42 per cent was steam, 26.3 per cent was sail, and 31.7 per cent was unrigged. The tonnage of these three classes of vessels formed 53 per cent, 31.2 per cent, and 15.8 per cent, respectively, of the total tonnage.

TABLE 10.—*Vessels grouped according to gross tonnage: 1906.*

TONNAGE.	Total.	Steam.	Sail.	Unrigged.
Total:				
Number of vessels	2,537	1,066	666	805
Gross tonnage	977,087	518,107	305,283	154,297
5 to 49 tons:				
Number of vessels	976	459	257	260
Gross tonnage	18,809	7,400	6,151	5,258
50 to 99 tons:				
Number of vessels	320	104	52	164
Gross tonnage	22,546	7,862	3,751	10,933
100 to 199 tons:				
Number of vessels	283	116	18	149
Gross tonnage	40,050	17,459	2,662	19,929
200 to 299 tons:				
Number of vessels	155	62	24	69
Gross tonnage	37,591	15,121	6,298	16,172
300 to 399 tons:				
Number of vessels	118	60	30	28
Gross tonnage	40,612	20,512	10,429	9,671
400 to 499 tons:				
Number of vessels	98	50	30	18
Gross tonnage	44,079	22,324	13,804	7,951
500 to 999 tons:				
Number of vessels	361	105	156	100
Gross tonnage	243,497	71,257	108,095	64,145
1,000 to 2,499 tons:				
Number of vessels	177	62	98	17
Gross tonnage	271,166	99,677	151,251	20,238
2,500 to 4,999 tons:				
Number of vessels	34	33	1	.....
Gross tonnage	109,680	106,838	2,842	.....
5,000 tons and over:				
Number of vessels	15	15	.....	.....
Gross tonnage	149,657	149,657	.....	.....

The vessels of from 5 to 999 tons numbered 2,311 and had a total tonnage of 447,184, representing 91.1 per cent of the number and 45.7 per cent of the tonnage of all the vessels of the Pacific coast. The vessels of from 1,000 tons or more numbered but 226, with a tonnage, however, of 530,503, representing, therefore, only 8.9 per cent of the total number and 54.3 per cent of the total tonnage.

Although the largest number of vessels, 976, in any one group is in the group with craft having a tonnage of from 5 to 49, their total tonnage is the smallest. The largest tonnage is found in the class 1,000 tons to 2,499 tons, with a total of 177 vessels and 271,166 tons, the largest proportion of this tonnage, 55.8 per cent, being for sailing vessels. It is a noticeable fact that this group practically ends the sailing craft, as but one sail vessel is found in the next larger class and none in the class which follows. Thus it seems safe to say that the useful limit of the sailing vessel on the Pacific coast is less than 2,500 tons.

Steam craft are of much larger tonnage than sailing or unrigged vessels, the size of the steam vessels being limited only by the ability to enter ports and to be handled profitably. There were but 15 vessels (steamers) of over 5,000 tons each, but they represented a total of 149,657 tons, or 15.3 per cent of the tonnage of all vessels on the Pacific coast.

The second largest number of vessels is found in the class 500 tons to 999 tons, and shows a fairly even distribution of vessels into steam, sail, and unrigged, both as to numbers and tonnage. In this class the unrigged vessels show their largest tonnage, 64,145, or 41.6 per cent of the total tonnage of the unrigged craft. Of the total number of vessels, more than one-half, 1,296, or 51.1 per cent, was of less than 100 tons each, although their total tonnage formed but 4.2 per cent of the total for all vessels.

CONSTRUCTION AND VALUATION.

The character of construction forms an interesting and instructive feature of these statistics, and is presented in connection with the reported valuation. Of the figures for valuation, however, it seems necessary to say again that there are so many and such conflicting elements associated with the determination of this fact that the results are unsatisfactory; they are presented, however, subject to the limitations referred to on the subject of valuation which appears in the United States section of this report.

Three kinds of construction are represented in Table 11; inasmuch, however, as composite construction is credited with but 3 vessels in 1906 and only 2 vessels in 1889, this class will be passed without further consideration and the discussion confined to the two important classes. As the statistics in this table do not distinguish between the vessels built of iron and those built of steel, for brevity and convenience this class will be termed "metal" as distinguished from "wood."

In 1906, as in 1889, much the larger number and tonnage were reported for the wooden vessels, although the percentage of tonnage was considerably diminished in 1906. On the other hand, however, the value of metal vessels, which amounted to less than one-half that of wooden vessels in 1889, had assumed the leading position at the census of 1906. The freight and passenger

vessels are responsible for most of this increase in the value of metal construction, this class representing 52.5 per cent of the total value of all vessels on the Pacific coast in 1906, as compared with 29.5 per cent in 1889. The growth of metal construction in freight and passenger vessels is shown by a glance at the increases in this class in number, tonnage, and value. In 1906 the number of such vessels was almost six times as great as in 1889, the tonnage over seven times as great, and the value over six times.

TABLE 11.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND OCCUPATION AND BY CHARACTER OF CONSTRUCTION: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Aggregate	1906	2,537	977,687	$76,622,633	130	354,134	$41,375,742	2,404	622,606	$35,168,891	3	947	$78,000
	1889	1,635	419,157	21,824,040	23	48,121	6,613,065	1,610	369,738	15,100,975	2	1,298	110,000
Steam	1906	1,066	518,107	60,440,145	105	318,995	39,702,536	959	198,279	20,664,609	2	833	73,000
	1889	465	160,293	14,767,355	22	47,124	6,573,065	442	112,080	8,094,290	1	1,089	100,000
Freight and passenger	1906	604	451,270	52,164,977	86	313,217	38,553,013	517	137,634	13,561,964	1	419	50,000
	1889	354	129,491	12,660,755	17	46,140	6,398,065	336	82,262	6,162,690	1	1,089	100,000
Tugs and other towing vessels	1906	313	24,151	3,353,927	14	2,482	623,194	299	21,669	2,730,733	.....	.....	.....
	1889	70	6,109	1,120,800	4	569	135,000	66	5,540	985,800	.....	.....	.....
Ferryboats	1906	47	40,171	4,315,522	2	2,964	450,000	44	36,793	3,842,522	1	414	23,000
	1889	38	24,630	979,300	1	415	40,000	37	24,215	939,300	.....	.....	.....
Yachts	1906	66	1,065	294,800	1	102	17,000	65	963	277,800	.....	.....	.....
	1889	3	63	6,500	.....	.....	.....	3	63	6,500	.....	.....	.....
All other	1906	36	1,450	310,919	2	230	59,329	34	1,220	251,590	.....	.....	.....
	1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sail	1906	666	305,283	11,533,171	20	31,848	1,642,206	645	273,321	9,885,965	1	114	5,000
	1889	681	195,508	6,231,340	1	997	40,000	679	194,302	6,181,340	1	209	10,000
Freight and passenger	1906	547	302,798	11,275,586	20	31,848	1,642,206	527	270,950	9,633,380	.....	.....	.....
	1889	647	194,478	6,112,340	1	997	40,000	645	193,272	6,062,340	1	209	10,000
Yachts	1906	104	1,459	174,110	.....	.....	.....	104	1,459	174,110	.....	.....	.....
	1889	25	612	69,300	.....	.....	.....	25	612	69,300	.....	.....	.....
All other	1906	15	1,026	83,475	.....	.....	.....	14	912	78,475	1	114	5,000
	1889	9	418	49,700	.....	.....	.....	9	418	49,700	.....	.....	.....
Unrigged[1]	1906	805	154,297	4,649,317	5	3,291	31,000	800	151,006	4,618,317	.....	.....	.....
	1889	489	63,356	825,345	.....	.....	.....	489	63,356	825,345	.....	.....	.....

[1] The character of construction was not reported in 1889, but for purposes of comparison in this table all vessels are assumed to be of wood.

The feature of increased valuation is conspicuous also in freight and passenger vessels of wooden construction, their value being $23,195,344, or 30.3 per cent of the value of all vessels, in 1906, as compared with $12,225,030, or 56 per cent, in 1889. This class of wood construction increased as follows: Number of vessels, 63, or 6.4 per cent; gross tonnage, 133,050, or 48.3 per cent; valuation, $10,970,314, or 89.7 per cent. Wooden construction can not be passed without directing attention to a class of vessels peculiar to the Pacific coast known as steam schooners. These vessels are of low power, very staunch, and of great carrying capacity. Unlike the steamer in general, they have the characteristic of the sailing schooner, in that they are able to carry large deck loads of lumber. Although some of these vessels have been built in eastern yards, because of their great and immediate demand, they are mostly the creation of Pacific coast yards, where the abundance of timber has stimulated their production. Upward of 100 of these specially constructed steamers are owned in San Francisco for use in the transportation of lumber.

Ferryboats increased largely in valuation between the two censuses, their value being $4,315,522, or 5.6 per cent of the value of all vessels on that coast in 1906, compared with $979,300, or 4.5 per cent, in 1889. Wood is still shown to be the favorite material for the construction of this class of boats, as out of a total for both classes of 46 vessels of 39,757 tons in 1906 only 2 of 2,964 tons were of metal construction, while in 1889 there was but one of 415 tons out of a total of 38 of 24,630 tons. In the years from 1889 to 1906 two ferryboats, of 1,631 and 1,333 tons, respectively, were added to the metal fleet, the one boat of this class shown in 1889 not being reported in 1906.

The tugs and other towing vessels were also largely of wood construction at both censuses. Although there has been a considerable increase in metal construction of this class of vessels, it has not been sufficient to cause any marked change in the relative proportion of metal and wood construction. The metal construction represented 4.5 per cent of all vessels of this class, 10.3 per cent of their tonnage, and 18.6 per cent of their value in 1906, as compared with 5.7 per cent, 9.3 per cent, and 12 per cent, respectively, for the three items in 1889.

Unrigged craft were not reported as to character of construction at the census of 1889, and all vessels

of this class for that year have been assumed to be of wood construction; and as the unrigged vessels of metal construction at the census of 1906 formed but six-tenths of 1 per cent of the total number of unrigged craft, 2.1 per cent of the total tonnage, and seven-tenths of 1 per cent of the total value, there could have been but slight error in the classification.

TABLE 12.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND BY CHARACTER OF CONSTRUCTION, WITH PER CENT OF TOTAL AND PER CENT OF INCREASE: 1906 AND 1889.

CLASS, AND CHARACTER OF CONSTRUCTION.	VESSELS.					TONNAGE.					VALUE OF VESSELS.				
	Number.		Per cent of total.		Per cent of increase.	Gross tons.		Per cent of total.		Per cent of increase.	Amount.		Per cent of total.		Per cent of increase.
	1906	1889	1906	1889		1906	1889	1906	1889		1906	1889	1906	1889	
Aggregate	2,537	1,635	100.0	100.0	55.2	977,687	419,157	100.0	100.0	133.3	$76,622,633	$21,824,040	100.0	100.0	251.1
Iron and steel	130	23	5.1	1.4	465.2	354,134	48,121	36.2	11.5	635.9	41,375,742	6,613,065	54.0	30.3	525.7
Wood	2,404	1,610	94.8	98.5	49.3	622,606	369,738	63.7	88.2	68.4	35,168,891	15,100,975	45.9	69.2	132.9
Composite	3	2	0.1	0.1	50.0	947	1,298	0.1	0.3	[1] 27.0	78,000	110,000	0.1	0.5	[1] 29.1
Steam	1,066	465	100.0	100.0	129.2	518,107	160,293	100.0	100.0	223.2	60,440,145	14,767,355	100.0	100.0	309.3
Iron and steel	105	22	9.8	4.7	377.3	318,995	47,124	61.6	29.4	576.9	39,702,536	6,573,065	65.7	44.5	504.0
Wood	959	442	90.0	95.1	117.0	198,279	112,080	38.3	69.9	76.9	20,664,609	8,094,290	34.2	54.8	155.3
Composite	2	1	0.2	0.2	100.0	833	1,089	0.2	0.7	[1] 23.5	73,000	100,000	0.1	0.7	[1] 27.0
Sail	666	681	100.0	100.0	[1] 2.2	305,283	195,508	100.0	100.0	56.1	11,533,171	6,231,340	100.0	100.0	85.1
Iron and steel	20	1	3.0	0.1	1,900.0	31,848	997	10.4	0.5	3,094.4	1,642,206	40,000	14.2	0.6	4,005.5
Wood	645	679	96.8	99.7	[1] 5.0	273,321	194,302	89.5	99.4	40.7	9,885,965	6,181,340	85.7	99.2	59.9
Composite	1	1	0.2	0.1	.....	114	209	[2]	0.1	[1] 45.5	5,000	10,000	[2]	0.2	[1] 50.0
Unrigged [3]	805	489	100.0	100.0	64.6	154,297	63,356	100.0	100.0	143.5	4,649,317	825,345	100.0	100.0	463.3
Iron and steel	5	.....	0.6	.....	.....	3,291	.....	2.1	.....	.....	31,000	.....	0.7	.....	.....
Wood	800	489	99.4	100.0	63.6	151,006	63,356	97.9	100.0	138.3	4,618,317	825,345	99.3	100.0	459.6

[1] Decrease.
[2] Less than one-tenth of 1 per cent.
[3] The character of construction of unrigged craft was not reported in 1889, but for purposes of comparison in this table all were assumed to be of wood.

At the census of 1906, as compared with that of 1889, the actual increase in the number of vessels of metal construction was but 107, while the gain in vessels of wood was 794; the percentages of gain, however, were 465.2 and 49.3, respectively. Although the relative proportion of increase in tonnage is not dissimilar—635.9 per cent for metal construction and 68.4 per cent for wood—the actual gain was 306,013 for metal and 252,868 for wood. In value metal construction showed an actual gain of $34,762,677, or 525.7 per cent, compared with $20,067,916, or 132.9 per cent, for wood. Thus it is seen that the increased value of metal construction was nearly as large as the total value of all vessels of wood construction.

The growth of metal construction is further evidenced by a glance at the relative proportions which the number, tonnage, and value of this character of construction held at the two censuses.

Most of this great gain was in steam craft. In fact, so far as new construction is concerned, it may be said to be entirely due to steam-propelled vessels, since practically the entire gain in sailing vessels of metal construction has been caused by the addition of vessels to the fleet in accordance with various acts of Congress.

Table 13 is particularly misleading as connected with the Pacific coast fleet, since vessels built on the Atlantic coast and in other sections of the country were documented in those localities and therefore do not appear in this table, although they belong to the Pacific coast fleet. Among such vessels are the 2 steamers, *Minnesota* and *Dakota*, of over 20,000 gross tons each. These 2 fine steamers, built in an eastern shipyard for the Pacific trade, were documented in New York city.

TABLE 13.—NUMBER AND GROSS TONNAGE OF VESSELS ADDED TO THE DOCUMENTED FLEET EACH YEAR, BY CLASS AND BY CHARACTER OF CONSTRUCTION: 1880 TO 1906.[1]

YEAR.	AGGREGATE.								STEAM.							
	Total.		Iron.		Steel.		Wood.		Total.		Iron.		Steel.		Wood	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	200	22,206	.....	.....	2	893	198	21,313	117	9,746	.....	.....	2	893	115	8,853
1905	169	25,831	1	1,854	3	2,398	165	21,579	108	12,141	.....	.....	2	184	106	11,957
1904	180	21,926	.....	.....	4	1,866	176	20,060	118	12,878	.....	.....	4	1,866	114	11,012
1903	191	48,140	1	2,976	7	11,777	183	33,387	106	24,736	1	2,976	6	10,692	99	11,068
1902	226	55,794	1	639	3	12,838	222	42,317	98	22,060	1	639	2	10,707	95	10,714
1901	287	77,859	5	7,187	12	24,050	270	46,622	100	30,281	.....	.....	8	17,348	92	12,933
1900	314	55,102	4	8,368	5	5,631	305	41,103	84	21,578	1	3,945	4	4,649	79	12,984
1899	314	56,439	5	14,069	12	3,317	297	39,053	140	39,361	4	12,126	12	3,317	124	23,918
1898	236	63,339	4	7,030	6	10,551	226	45,758	121	45,373	2	4,805	6	10,551	113	30,017
1897	66	8,902	1	1,160	.....	.....	65	7,742	33	3,703	1	1,160	.....	.....	32	2,543
1896	93	10,818	.....	.....	2	707	91	10,111	31	4,929	.....	.....	2	707	29	4,222
1895	76	8,060	1	900	1	2,504	74	4,656	19	5,043	.....	.....	1	2,504	18	2,539
1894	60	5,499	.....	.....	1	103	59	5,396	20	3,697	.....	.....	1	103	19	3,594
1893	91	13,721	.....	.....	1	3,528	90	10,193	28	7,184	.....	.....	1	3,528	27	3,656
1892	139	20,770	.....	.....	1	400	138	20,370	49	9,940	.....	.....	1	400	48	9,540
1891	122	19,070	.....	.....	.....	.....	122	19,070	54	9,167	.....	.....	.....	.....	54	9,167
1890	95	17,383	1	2,755	1	2,293	93	12,335	58	9,651	1	2,755	.....	.....	57	6,896
1889	112	17,939	.....	.....	2	379	110	17,560	72	12,747	.....	.....	2	379	70	12,368
1888	105	23,174	.....	.....	1	1,081	104	22,093	55	12,710	.....	.....	1	1,081	54	11,629
1887	74	9,240	.....	.....	1	80	73	9,160	33	3,851	.....	.....	1	80	32	3,771
1886	58	5,914	.....	.....	.....	.....	58	5,914	23	3,023	.....	.....	.....	.....	23	3,023
1885	77	11,507	1	1,362	1	828	75	9,317	38	8,868	1	1,362	1	828	36	6,678
1884	85	10,620	.....	.....	.....	.....	85	10,620	42	5,866	.....	.....	.....	.....	42	5,866
1883	91	16,738	.....	.....	.....	.....	91	16,738	34	4,019	.....	.....	.....	.....	34	4,019
1882	76	15,832	1	27	.....	.....	75	15,805	29	6,782	1	27	.....	.....	28	6,755
1881	61	11,554	.....	.....	.....	.....	61	11,554	21	3,010	.....	.....	.....	.....	21	3,010
1880	42	9,940	2	1,412	.....	.....	40	8,528	25	7,643	1	415	.....	.....	24	7,228

YEAR.	SAIL.								UNRIGGED.	
	Total.		Iron.		Steel.		Wood.		Wood.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	21	4,424	.....	.....	.....	.....	21	4,424	62	8,036
1905	23	8,528	1	1,854	1	2,214	21	4,460	38	5,162
1904	28	4,586	.....	.....	.....	.....	28	4,586	34	4,462
1903	51	21,552	.....	.....	1	1,085	50	20,467	34	1,852
1902	49	27,816	.....	.....	1	2,131	48	25,685	79	5,918
1901	61	40,048	5	7,187	4	6,702	52	26,159	126	7,530
1900	58	23,317	3	4,423	1	982	54	17,912	172	10,207
1899	45	9,629	1	1,943	.....	.....	44	7,686	129	7,449
1898	50	10,578	2	2,225	.....	.....	48	8,353	65	7,388
1897	33	5,199	.....	.....	.....	.....	33	5,199	.....	.....
1896	62	5,889	.....	.....	.....	.....	62	5,889	.....	.....
1895	57	3,017	1	900	.....	.....	56	2,117	.....	.....
1894	40	1,802	.....	.....	.....	.....	40	1,802	.....	.....
1893	63	6,537	.....	.....	.....	.....	63	6,537	.....	.....
1892	89	10,615	.....	.....	.....	.....	89	10,615	1	215
1891	68	9,903	.....	.....	.....	.....	68	9,903	.....	.....
1890	37	7,732	.....	.....	1	2,293	36	5,439	.....	.....
1889	40	5,192	.....	.....	.....	.....	40	5,192	.....	.....
1888	49	10,359	.....	.....	.....	.....	49	10,359	1	105
1887	41	5,389	.....	.....	.....	.....	41	5,389	.....	.....
1886	35	2,891	.....	.....	.....	.....	35	2,891	.....	.....
1885	39	2,639	.....	.....	.....	.....	39	2,639	.....	.....
1884	43	4,754	.....	.....	.....	.....	43	4,754	.....	.....
1883	56	11,548	.....	.....	.....	.....	56	11,548	1	1,171
1882	47	9,050	.....	.....	.....	.....	47	9,050	.....	.....
1881	38	7,519	.....	.....	.....	.....	38	7,519	2	1,025
1880	16	1,934	1	997	.....	.....	15	937	1	363

[1] Includes all vessels, except yachts, reported by the Commissioner of Navigation as built, admitted to registry by acts of Congress renationalized, and purchased from the United States.

The average number of documented vessels added to the Pacific coast fleet for the twenty-seven years from 1880 to 1906 was 135 and the average tonnage 24,567. The six years from 1898 to 1903 were the most marked in the growth of this fleet, showing an average per year of 261 in number and 59,446 in tonnage. The largest number of vessels added in a single year was 314, reported for both 1899 and 1900, and the smallest number, 42, for 1880. The largest tonnage, 77,859, was added in 1901, and the smallest, 5,499, in 1894. Wood construction shows its largest growth during the six years from 1898 to 1903 and steel vessels from 1901 to 1903. Of the 22 steel vessels added from 1901 to 1903, 16 were steamers, and their tonnage amounted to 38,747, or 79.6 per cent of the total tonnage of the steel vessels. Wood construction from 1898 to 1903 was represented by 1,503 vessels of 248,240 tons. Six hundred and two, or 40.1 per cent of the number, having a tonnage of 101,634, or 40.9 per cent, were steam vessels; 296, or 19.7 per cent of the number, and 106,262 tons, or 42.8 per cent of the tonnage, were sail vessels; while 605, or 40.3 per cent

of the number, and 40,344 tons, or 16.3 per cent of the tonnage, were reported for the unrigged craft. There were 28 vessels of 49,739 tonnage of iron construction. Of these, however, 25 of 47,935 tonnage were added to the fleet not by natural growth by being built on the Pacific coast, or in fact in any section of the United States, but by being admitted to American registry by various acts of Congress. The following statement shows the number and tonnage of the several classes of vessels which were added to the documented merchant marine on the Pacific coast by general or special acts of Congress, by being renationalized, or by purchase from the United States:

	TOTAL.		STEAM.		SAIL.		UNRIGGED.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total..	80	91,551	37	51,374	40	38,747	3	1,430
Iron.....	25	47,935	11	28,406	14	19,529	.....	.....
Steel.....	16	32,652	7	17,245	9	15,407	.....	.....
Wood.....	39	10,964	19	5,723	17	3,811	3	1,430

The growth in the size of the vessels of the Pacific fleet is indicated by the average tonnage and the average value per vessel and per ton for the censuses of 1906 and 1889.

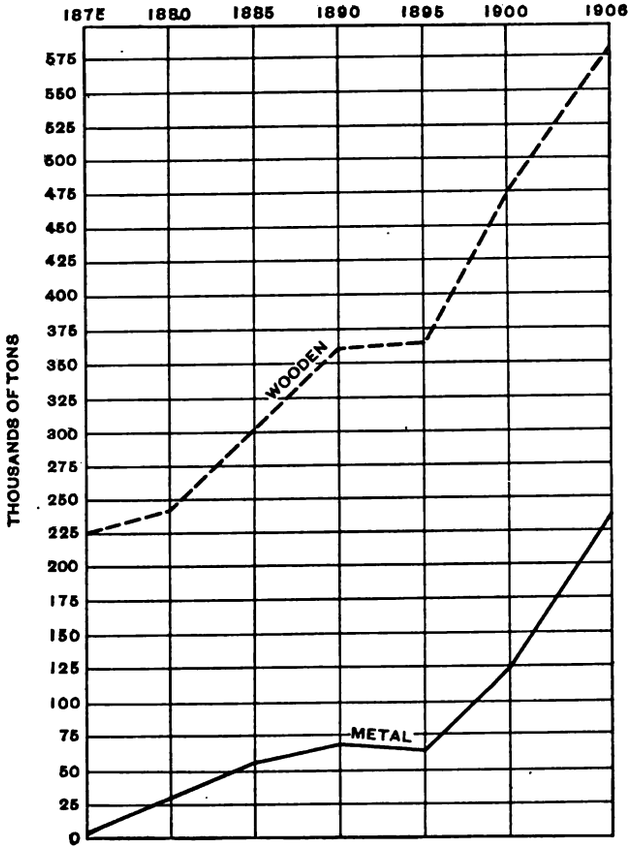
TABLE 14.—AVERAGE GROSS TONNAGE AND VALUE PER VESSEL AND AVERAGE VALUE PER TON: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD			COMPOSITE.		
		Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.
Aggregate.....	1906	385	$30,202	$78	2,724	$318,275	$117	259	$14,629	$56	316	$26,000	$82
	1889	256	13,348	52	2,092	287,525	137	230	9,379	41	649	55,000	85
Steam.....	1906	486	56,698	117	3,038	378,119	124	207	21,548	104	417	36,500	88
	1889	345	31,758	92	2,142	298,776	139	254	18,313	72	1,089	100,000	92
Freight and passenger.....	1906	747	86,366	116	3,642	448,291	123	266	26,232	99	419	50,000	119
	1889	366	35,765	98	2,714	376,357	139	245	18,341	75	1,089	100,000	92
Tugs and other towing vessels...	1906	77	10,715	139	177	44,514	251	72	9,133	126	.....	.....	.....
	1889	87	16,011	183	142	33,750	237	84	14,936	178	.....	.....	.....
Ferryboats.....	1906	855	91,820	107	1,482	225,000	152	836	87,330	104	414	23,000	56
	1889	648	25,771	40	415	40,000	96	654	25,386	39	.....	.....	.....
Yachts.....	1906	16	4,467	277	102	17,000	167	15	4,274	288	.....	.....	.....
	1889	21	2,167	103	.....	.....	.....	21	2,167	103	.....	.....	.....
All other.....	1906	40	8,637	214	115	29,665	258	36	7,400	206	.....	.....	.....
	1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sail.....	1906	458	17,317	38	1,592	82,110	52	424	1,533	36	114	5,000	44
	1889	287	9,150	32	997	40,000	40	286	9,104	32	209	10,000	48
Freight and passenger.....	1906	554	20,614	37	1,592	82,110	52	514	18,280	36	.....	.....	.....
	1889	301	9,447	31	997	40,000	40	300	9,399	31	209	10,000	48
Yachts.....	1906	14	1,674	119	.....	.....	.....	14	1,674	119	.....	.....	.....
	1889	24	2,772	113	.....	.....	.....	24	2,772	113	.....	.....	.....
All other.....	1906	68	5,565	81	.....	.....	.....	65	5,605	86	114	5,000	44
	1889	46	5,522	119	.....	.....	.....	46	5,522	119	.....	.....	.....
Unrigged.....	1906	192	5,776	30	658	6,200	9	189	5,773	31	.....	.....	.....
	1889	130	1,688	13	.....	.....	.....	130	1,688	13	.....	.....	.....

The freight and passenger class and the unrigged craft, which together represented 92.9 per cent of the entire tonnage and comprised practically all of the freight carrying vessels in 1906, show great increases in their average tonnage. Steam freight and passenger vessels increased 381 tons each, or 104.1 per cent; the sailing vessels of this class made an average gain of 253 tons, or 84.1 per cent; and the unrigged craft increased 62 tons each, or 47.7 per cent. The average value of the freight and passenger vessels increased as follows: Steam, $50,601, or 141.5 per cent, and sail, $11,167, or 118.2 per cent; while the average for the unrigged vessels increased $4,088, or 242.2 per cent. The metal freight and passenger vessels propelled by steam showed the largest average tonnage and also the largest average value in 1906 as in 1889. Metal sailing vessels of this class, although much less numerous than the steam craft, ranked second in average tonnage and third in average value. The average tonnage of the freight and passenger metal built steamers increased 928, or 34.2 per cent. The wooden vessels of this class showed but a small increase in average size per vessel—21 tons, or 8.6 per cent—while the increase in average value was $7,891, or 43 per cent. The metal freight and passenger vessels that were dependent upon sail power made an average gain of 595 tons, or 59.7 per cent. Of metal built vessels, ferryboats showed the most marked increase, the gain in average tonnage of these steam vessels being 1,067, or 257.1 per cent, and the increase in average value, $185,000, or 462.5 per cent. The average size and value of ferryboats built of wood increased 182 tons and $61,944, respectively. Towing vessels as a whole decreased 10 tons, or 11.5 per cent, in average size and $5,296, or 33.1 per cent, in average value. The metal class increased 35 tons, or 24.6 per cent, in average size and $10,764, or 31.9 per cent, in average

value; while those of wood construction decreased in average size 12 tons and in average value $5,803, or 38.9 per cent.

DIAGRAM 1.—*Relative amount of tonnage of metal and wooden vessels: 1875 to 1906.*



Unrigged craft increased in all classes and for all items. In 1889 no metal construction was reported for unrigged vessels, but the 5 which were reported in 1906 averaged 658 tons in size and $6,200 in value. Wooden construction in this class made an average increase of 59 tons, or 45.4 per cent, in size and $4,085, or 242 per cent, in value.

CHARACTER OF PROPULSION AND HORSEPOWER.

Statistics showing character of propulsion and power are not available for previous censuses, but they were secured at the census of 1906.

Of the total number of vessels, 725, or 68 per cent, were steamers and 341, or 32 per cent, used gasoline. The steam vessels represented 511,607 tons, or 98.7 per cent of the total tonnage, and 435,020 horsepower, or 97.6 per cent of all the horsepower; while the vessels using gasoline embraced but 6,500 tons, or 1.3 per cent, with 10,697 horsepower, or 2.4 per cent of the total. The screw propeller was used in the propulsion of 78.5 per cent of the vessels, while 17.9 per cent were stern wheelers, and 3.6 per cent were side wheelers. The tonnage of the three types of vessels formed 80.1 per cent, 13 per cent, and 6.8 per cent, respectively, of the total tonnage. The horsepower represented by these three classes was as follows: Screw propeller, 82.5 per cent; stern wheel, 12.2 per cent; and side wheel, 5.2 per cent. It is somewhat surprising to note the fact that the small number of side wheel vessels, mostly ferry-boats, so greatly exceeds all other classes in average tonnage and horsepower.

TABLE 15.—*Number, gross tonnage, and horsepower of vessels, by character of propulsion and power, with average tonnage and horsepower: 1906.*

PROPULSION AND POWER.	Number of vessels.	Gross tonnage.	Horse-power.	Average tonnage.	Average horse-power.
Total	1,066	518,107	445,717	486	418
Screw	837	415,100	367,875	496	440
Steam	507	408,849	357,503	806	705
Gasoline	330	6,251	10,372	19	31
Stern wheel	191	67,539	54,479	354	285
Steam	184	67,364	54,271	366	295
Gasoline	7	175	208	25	30
Side wheel	38	35,468	23,363	933	615
Steam	34	35,394	23,246	1,041	684
Gasoline	4	74	117	19	29

The largest American vessel in the United States belonged to the Pacific coast fleet. It is of interest to note the largest tonnage and the largest horsepower of the vessels of the various classes, although the largest horsepower, except for the side wheelers, was not that reported for the particular vessels for which the largest tonnage was shown.

TYPE.	LARGEST GROSS TONNAGE.		LARGEST HORSE-POWER.	
	Steam.	Gasoline.	Steam.	Gasoline.
Screw	20,718	534	12,000	300
Side wheel	3,549	39	2,000	65
Stern wheel	1,211	53	1,300	50

It is unfortunate that data as to the kinds of fuel used and the cost per horsepower are not available in connection with the foregoing description of the Pacific coast fleet. It was deemed impracticable to secure this information, just as it was to obtain reliable figures as to the number of miles the freight was carried. In view, however, of the scarcity of coal and the abundance of oil on the Pacific coast it will be surprising if there is not a more extensive use of fuel of the latter character, especially as recent experiments appear to have overcome, to a great extent, the objections to the use of oil under marine boilers.

TABLE 16.—*Character of propulsion and horsepower of steam vessels, by occupation: 1906.*

OCCUPATION.	CHARACTER OF PROPULSION.				HORSEPOWER OF ENGINES.		
	Total.	Screw (number).	Side wheel (number).	Stern wheel (number).	Total.	Steam.	Gasoline.
Total	1,066	837	38	191	445,717	435,020	10,697
Freight and passenger	604	455	5	144	362,182	355,849	6,333
Tugs and other towing vessels	313	272	2	39	50,284	47,764	2,520
Ferryboats	47	10	31	6	29,165	29,079	86
Yachts	66	66			2,047	810	1,237
All other	36	34		2	2,039	1,518	521

The freight and passenger vessels formed the most numerous class, constituting 56.7 per cent of the total number and 81.3 per cent of the total horsepower. Of the 604 vessels of this class, 75.3 per cent was equipped with the screw propeller, 23.8 per cent was stern wheelers, and eight-tenths of 1 per cent was side-wheelers. Tugs and other towing vessels had a larger proportion of screw propellers, 86.9 per cent of the total for the class; while 12.5 per cent was stern wheelers, and only six-tenths of 1 per cent was side wheelers. Ferryboats embraced most of the side wheel craft, as 81.6 per cent of the side wheel vessels was found in this class. It is also noticeable that gasoline was but little used in this class of vessels, as only three-tenths of 1 per cent of the total horsepower for ferryboats is shown as gasoline.

Yachts were wholly propelled by screw propellers, as were 34 of the 36 vessels embraced in the "all other" class. Of the 66 yachts using power, 58 used gasoline. The extent of this form of propulsion is not fully shown by these tables, as no reports were secured for boats of less than 5 tons, many of which were equipped with auxiliary power of this character. So extensive has become the practice of installing auxiliary power in small craft that comparatively few yachts are being built without such equipment, except those intended for racing purposes.

INCOME.

The income for the several classes of vessels was not shown separately in 1889, hence comparative statistics are not available for that census except by totals, as shown in Table 1. It is not claimed for the income presented in Table 17 that it is absolutely correct, but simply that it is a fair general presentation based upon a very careful and intelligent canvass but subject to inherent difficulties almost insuperable.

Of the income, 60.5 per cent was derived from freight and 21.5 per cent from passengers. The steam freight and passenger vessels had the largest income, almost $30,000,000, or 61.2 per cent of the total income. The sailing vessels of this class had an income that formed 17.1 per cent of the total, and the combined income for the freight and passenger vessels amounted to $37,969,854, or 78.3 per cent of the total income.

TABLE 17.—*Gross income—all vessels and craft, by class and occupation: 1906.*

CLASS AND OCCUPATION.	Total.	Freight.	Passenger.	All other.
Total	$48,520,139	$29,340,102	$10,424,493	$8,755,544
Steam	37,287,470	20,600,325	10,414,347	6,272,798
Freight and passenger	29,692,075	20,065,562	8,365,559	1,260,954
Tugs and other towing vessels	3,305,938	534,463	10,208	2,761,267
Ferryboats	4,208,430		2,037,580	2,170,850
Yachts	2,500			2,500
All other	78,527	300	1,000	77,227
Sail	8,299,751	8,090,122	10,146	199,483
Freight and passenger	8,277,779	8,090,007	10,146	177,626
Yachts	100			100
All other	21,872	115		21,757
Unrigged	2,932,918	649,655		2,283,263

The income reported for tugs and other towing vessels amounted to 6.8 per cent of the total. For this class $534,463 is reported as income from freight carried, which, as tugs are notoriously deficient as cargo carriers, no doubt represents charges for freight that was actually carried on unrigged vessels. Thus it often happened that where the tug and the tow were controlled by the same ownership the income for freight charges was reported for the tug; whereas if controlled by different ownerships, the tug was credited with the towing charges and the unrigged craft was credited with the income for the freight. The $2,761,267 reported for this class under "all other" was mostly for towing. The income for ferryboats is nearly evenly divided between the transportation of passengers and "all other," the latter item for ferryboats being composed mostly of the estimated charges for transporting freight in bulk; that is, in cars across rivers or bays where the freight is not disturbed in transit. Unrigged craft had an income of 6 per cent of the total. Most of this income was reported as "all other" and represents what has been classed as lighterage, or short freight handling, generally harbor transfers of freight, to distinguish it from the regular freight shipments and in a measure avoid a duplication.

The freight reported as lightered amounted to 2,431,564 tons in 1889 and 4,321,523 tons in 1906, the increase being 1,889,959 tons, or 77.7 per cent.

Of the total income from passenger service, freight and passenger vessels, steam and sail, reported $8,375,705, or 80.3 per cent, and ferryboats, $2,037,580, or 19.5 per cent. The proportions for the two classes of vessels are reversed, however, in the case of the number of passengers carried.

The "all other" income, in addition to representing towing charges and lighterage, includes considerable amounts for dredging, pile driving, chartered vessels, etc.

EMPLOYEES AND WAGES.

No attempt is made to present comparative figures for employees and wages for 1889, because it is certain that the data were not collected on the same general lines at that census and the census of 1906, and there exists also a doubt as to the exact basis upon which the statistics for 1889 were secured. At the census of 1906, board was included as part compensation for employees on vessels, and, as has been explained, the total number of these employees was reported regardless of the length of service. Thus the total wages for a vessel might be what would be earned by the crew for a few weeks or months in some instances and for the whole year in others, dependent entirely upon the period during which the vessel was in commission. When it is considered that the number of the crew necessary to operate a vessel would be the same whether for a long or a short period, it will readily be seen that average annual earnings based upon these figures would be misleading.

TABLE 18.—EMPLOYEES, AND SALARIES AND WAGES: 1906.

	TOTAL.		STEAM.		SAIL.		UNRIGGED.	
	Number of employees.	Salaries and wages.	Number of employees.	Salaries and wages.	Number of employees.	Salaries and wages.	Number of employees.	Salaries and wages.
Total	25,519	$17,190,022	17,954	$12,796,638	5,972	$3,213,438	1,593	$1,179,946
On vessels	20,142	12,950,399	14,423	9,330,294	4,481	2,719,571	1,238	900,534
On land	5,377	4,239,623	3,531	3,466,344	1,491	493,867	355	279,412
Officers, managers, clerks, etc.	1,853	1,768,849	1,678	1,641,438	159	98,643	16	28,768
All other	3,524	2,470,774	1,853	1,824,906	1,332	395,224	339	250,644

Table 18 embraces in one general total all classes of employees on the vessels, irrespective of their rank or duties. The land employees are divided into two classes, one including officers, managers, clerks, etc., and the other embracing chiefly laborers, stevedores, etc., engaged in loading or unloading vessels.

The employees on vessels formed 78.9 per cent of the total number of employees of all classes, and their salaries and wages amounted to 75.3 per cent of the total. The land force comprised 21.1 per cent of the total number for all classes of employees, and they were paid 24.7 per cent of the total amount expended in salaries and wages. A little more than one-third of the land force was officers, managers, clerks, etc., and nearly two-thirds was in the "all other" class.

Of the employees of all classes, 70.4 per cent was connected with steam vessels; 23.4 per cent, with sailing vessels; and 6.2 per cent, with unrigged craft. Salaries and wages were distributed as follows: Steam vessels, 74.4 per cent; sailing vessels, 18.7 per cent; and unrigged craft, 6.9 per cent.

FREIGHT.

The fact that the commodities shown for freight shipments are those selected for a schedule to be used to secure statistics for the country as a whole will explain the appearance in Table 19 of such commodities as cotton, tobacco, iron ore, etc., that are insignificant as applied to the Pacific coast, and yet are important in other sections of the country.

TABLE 19.—FREIGHT SHIPPED FROM SELECTED PORTS AND ALASKA, BY COMMODITIES: 1906.

COMMODITY.	Total.	Portland.	Sacramento.	San Francisco.	Seattle.	Stockton.	Tacoma.	Alaska.	All other ports.
Total.....net tons..	13,301,293	492,573	254,023	1,656,614	856,988	260,195	270,256	218,515	9,292,129
Canned goods.....net tons..	144,372	7,283	700	25,519	24,908	.....	1,037	44,029	40,896
Cement, brick, and lime.....net tons..	251,677	5,834	8,078	55,524	2,590	1,256	4,810	.....	173,585
Coal.....net tons..	451,781	730	3,099	30,865	178,805	.....	29,468	3,037	205,777
Cotton.....net tons..	25,957	.....	.....	13,957	11,988	.....	.....	.....	2
Flour.....net tons..	350,918	40,049	297	36,468	108,087	108,343	5,544	2,784	49,346
Fruits and vegetables.....net tons..	232,214	2,956	46	25,733	11,701	30,352	1,033	84	160,309
Grain.....net tons..	691,779	55,019	2,936	117,856	58,411	85,461	34,137	2,944	335,015
Ice.....net tons..	2,493	100	55	100	583	.....	4	100	1,551
Iron ore.....net tons..	37	14	.....	.....	.....	.....	.....	.....	23
Lumber.....M feet [1]..	1,981,930	145,023	7,511	86,829	58,056	2,031	78,174	6,753	1,597,553
Naval stores.....net tons..	10,267	.....	.....	1,170	7,383	.....	1,000	.....	714
Petroleum and other oils.....barrels [1]..	10,929,939	9,271	64,432	62,120	50,356	33,160	2,577	31,689	10,676,334
Phosphate and fertilizer.....net tons..	37,144	182	.....	12,026	1,432	.....	185	1,500	21,819
Pig iron and steel rails.....net tons..	19,861	1,406	.....	1,898	12,261	.....	301	7	3,988
Stone, sand, etc.....net tons..	2,340,008	2,355	.....	10,210	325	3,000	.....	.....	2,324,118
Tobacco.....net tons..	2,115	162	.....	152	1,736	.....	13	12	40
Miscellaneous merchandise.....net tons..	3,536,392	117,606	211,171	1,157,213	322,850	20,768	55,339	144,793	1,506,652

[1] Reduced to net tons for total.

It would be desirable to present comparative statistics with the census of 1889, but the difference in the methods of securing the data, together with the uncertainty as to what was reported at that census, renders such a comparison of doubtful value.

In 1906 there were many difficulties to be contended with in securing reliable figures as to the kind and total amount of freight carried, and to these were added the destruction of records by the great conflagration following the earthquake in San Francisco.

It must be understood, therefore, that in spite of a general willingness on the part of the shipping interests to cooperate with the Office, and comply with the requirements of the census, much of the information was necessarily in the character of estimates. In the aggregate, however, it is believed the presentation is a fair approximation of the freight movements by Pacific coast vessels.

Of the commodities specifically named in Table 19, that of most importance was lumber, with 1,981,930 thousand feet, equivalent to 3,504,742 tons, or 26.3 per cent of the total freight shipments. This showing is not unexpected, in view of the great wealth of the Pacific coast in timber. At the census of 1905, California, Oregon, and Washington together contributed 12.6 per cent of the value of the total sawmill products of the country, while of the total estimated stand of merchantable timber, these 3 states held 38.5 per cent. So vast, indeed, is the business in this single commodity that an enormous fleet of steam and sailing vessels is necessary to meet the demand for its movement. The quantity of lumber reported in this table is exclusive of logs which may have been moved in the shape of rafts. Some of the logs so rafted were included in the census of 1889, and the fact that the extent to which they were included is uncertain, forms one of the reasons why comparisons with that census were found to be impracticable. An effort was made to ascertain the amount of logs rafted in 1906, but without success.

It is understood, however, that the rafting of logs was carried on to some extent in 1906. One of these rafts containing 6,000 logs, equivalent to 4,500,000 feet of lumber, was towed from the Columbia river to San Diego, Cal., a distance of about 1,000 miles. In addition to a great saving in the cost by this method of transportation, there is a gain to the shipper from the fact that most of the waste material which at the point of shipment is considered as refuse has a considerable value at the place of delivery—enough, it is claimed, to defray the cost of transportation.

Stone, sand, etc., is next in rank, with 2,340,008 tons, to which might be added the 251,677 tons of cement, brick, and lime, commodities that are suggestive of the extensive building operations of this section of the country. The total for these two items is 2,591,685 tons, or 19.5 per cent of all shipments. The oil wells of California are a source of considerable mineral wealth, as is shown by the fact that the state ranked third in these products, with 15.7 per cent of the total production for the country, at the census of mines and quarries taken in 1902. Shipments of oil were reported to the extent of 10,929,939 barrels, equivalent to 1,699,536 tons, or 12.8 per cent of the entire coast shipments of all classes of freight. Grain, flour, and fruits and vegetables are agricultural products that largely represent the fertility of the Pacific coast states, and have made that section of the country known in most parts of the civilized world. The shipments of grain, flour, and fruits and vegetables amounted to 1,274,911 tons, or 9.6 per cent of the total freight shipments.

Coal is not extensively mined in the Pacific coast states and in but one, Washington, is the output of this mineral worthy of mention. The shipment, therefore, in 1906 of 451,781 tons of coal is not significant of the production of coal on the Pacific coast, as it represents largely the shipments of this article from foreign ports in American vessels.

The only important commodity remaining is canned goods, which formed 1.1 per cent of the total tonnage of all shipments. The extent of the shipments of canned goods on the Pacific coast, which was more than one-third of the total shipments of this class of goods for the entire country, is not unexpected when it is considered that at the census of 1905 the value of the products of canned fruits and vegetables for California alone was nearly one-third of the total for the country, and the value of the products of the fish canneries of the three Pacific coast states and Alaska combined was more than one-half of the total value of products for this entire industry at the same census.

At the beginning of the canvass of the Pacific coast, 23 cities, or ports, were selected as those for which the attempt would be made to show the freight shipments by commodities.

Six of these cities and the territory of Alaska are specifically shown in Table 19. Eureka had shipments amounting to 489,521 tons, but as only two items of commodities, lumber and miscellaneous merchandise, were specifically reported, it was omitted from this table, which is intended to show shipments from ports where the freight was of a more general or diversified character. With this one exception, therefore, the cities are those having the highest rank in shipments of freight in American vessels during 1906. The 6 cities in the order of their importance as to freight shipments are shown in the following tabular statement:

CITY.	Freight shipments (net tons).	Per cent of total for six cities.	Per cent of total for Pacific coast.
Total	3,790,649	100.0	28.5
San Francisco	1,656,614	43.7	12.5
Seattle	856,988	22.6	6.4
Portland	492,573	13.0	3.7
Tacoma	270,256	7.1	2.0
Stockton	260,195	6.9	2.0
Sacramento	254,023	6.7	1.9

The largest amount of freight, 9,292,129 net tons, or 69.9 per cent of the total for the coast, was shipped from numerous ports and places which it is impracticable to show in this table. Lumber, stone, sand, etc., and oil contributed largely to the total, and were the character of freight that might be looked for as shipments from places unimportant from a standpoint of general marine business.

FERRY BUILDING, SAN FRANCISCO, CAL.

COMPREHENSIVE VIEW OF THE WATER FRONT AT SEATTLE, WASH.

PASSENGERS.

There was an increase of 28,517,878, or 182 per cent, in the number of passengers carried in 1906, as compared with 1889. Of this increase, 25,240,495, or 88.5 per cent, were ferry passengers, and 3,277,383, or 11.5 per cent, were classed as "all other," or those carried on vessels engaged in foreign, coastwise, and river traffic. The proportion of "all other" passengers to the total of all passengers carried was larger in 1906 than in 1889.

TABLE 20.—*Number of passengers, with per cent of total and per cent of increase: 1906 and 1889.*

	NUMBER.		PER CENT OF TOTAL.		Per cent of increase.
	1906	1889	1906	1889	
Total	44,189,971	15,672,093	100.0	100.0	182.0
Ferry	39,532,354	14,291,859	89.5	91.2	176.6
All other	4,657,617	1,380,234	10.5	8.8	237.5

The census figures do not show the number of these passengers by ports or districts, but an idea of the relative rank of several of the more important districts may be had from the following statement, taken from the report of the Steamboat Inspection Service, 1906. These figures, however, represent the fiscal year ending June 30, 1906, instead of the calendar or census year ending December 31, 1906.

LOCAL INSPECTION DISTRICT.	Number of passengers.
San Francisco	35,482,941
Seattle	3,170,452
Portland	2,318,850

IDLE VESSELS.

In addition to the 2,537 active vessels for which statistics have been presented in the foregoing tables, reports were received for a number of idle vessels, although there was no special canvass of such vessels. The special agents when obtaining reports for active vessels were instructed to secure information for idle vessels wherever found, but they were not to make special trips to secure reports for such vessels; consequently it is not claimed that Table 21 is complete.

TABLE 21.—*Idle vessels: 1906.*

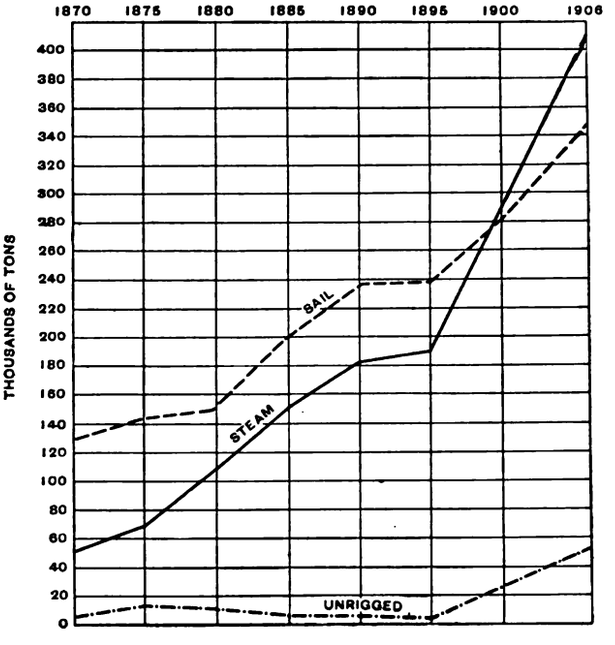
CLASS.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	252	28,229	$2,062,793
Steam	145	21,994	1,851,731
Sail	43	1,391	69,935
Unrigged	64	4,844	141,127

CONDITIONS BETWEEN CENSUS YEARS.

The foregoing statistics are those for two distinct periods, 1889 and 1906, censuses so widely apart that they leave much to be desired as to conditions for the intervening years. Another view, therefore, is presented in Table 22 as to the number and tonnage of the Pacific coast merchant marine fleet for each year from 1889 to 1906.

The statistics taken from the reports of the Commissioner of Navigation are not comparable with those taken by the Census, since, even if the data were secured on the same general lines, the report of the commissioner was for the fiscal year ending June 30, while that for the Census represents the calendar year ending December 31. The figures from the reports of the commissioner do not include yachts, or barges without sails or internal motive power of their own, but do include fishing vessels, while the Census figures do not include fishing vessels but do include yachts and barges. The difference in the methods of accounting for the classes of vessels which were common to both reports, is also a factor of considerable uncertainty, for whereas the registered and enrolled and licensed vessels of Table 22 include those recorded at the various customs districts, many vessels operating on the Pacific coast may be omitted if they were built and documented in other sections of the country. The Census figures, on the other hand, are for vessels operated on the Pacific coast, irrespective of the place of building.

DIAGRAM 2.—*Relative amount of tonnage, steam, sail, and unrigged vessels: 1870 to 1906.*



As might be expected, the larger proportion of the tonnage is found in the enrolled and licensed vessels, or those primarily intended for coastwise and inland trade, this class in 1906 representing 59.8 per cent of tonnage for all vessels, compared with 40.2 per cent for the registered vessels, or those qualified for foreign trade. Although in 1906 the steam and sail tonnage was very evenly distributed, there was a small preponderance in favor of steam craft. The largest total tonnage, 817,572, was reported for the year 1906, and the smallest, 428,392, for 1890. For three successive years, 1893, 1894, and 1895, there was a decrease in total tonnage, as compared with the year next preceding, the largest decrease shown for any one year being in 1895, and amounting to 22,857 tons, or 5 per cent. Of this decrease, 17,213 tons were for sailing vessels and 5,644 tons for steam craft. Two other years, 1890 and 1904, showed actual losses. Thus, of the years for which the figures are given, five showed losses and twelve increases. The greatest actual increase is shown for 1901 and amounted to 75,470 tons, or 12.6 per cent, 41,402 tons being for sailing vessels and 34,068 tons for steamers. In 1906 both steam and sail vessels reached their highest tonnage. For steam craft the smallest tonnage is shown for 1889 and for sailing vessels the smallest is for 1896.

TABLE 22.—NUMBER AND GROSS TONNAGE OF REGISTERED, ENROLLED, AND LICENSED SAIL AND STEAM VESSELS CONSTITUTING THE TOTAL MERCHANT MARINE OF THE PACIFIC COAST, INCLUDING FISHING VESSELS: 1889 TO 1906.[1]

YEAR.	TOTAL MERCHANT MARINE.							ENROLLED AND LICENSED VESSELS, UNDER 20 TONS.						
	Total.			Sail.[2]		Steam.		Total.			Sail.[2]		Steam.	
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	2,787	817,572	3.1	1,463	404,241	1,324	413,331	1,946	488,664	2.5	873	240,171	1,073	248,493
1905	2,674	793,088	2.3	1,458	396,337	1,216	396,751	1,926	476,672	3.7	928	246,942	998	229,730
1904	2,542	775,255	[3]0.1	1,422	389,752	1,120	385,503	1,942	459,549	1.1	1,013	239,411	929	220,138
1903	2,575	775,859	4.6	1,509	396,901	1,066	378,958	2,047	454,733	8.9	1,174	239,358	873	215,375
1902	2,492	741,825	9.6	1,496	390,606	996	351,219	2,001	417,503	8.4	1,188	218,128	813	199,375
1901	2,387	676,682	12.6	1,467	351,761	920	324,921	1,907	385,193	22.2	1,169	203,974	738	181,219
1900	2,203	601,212	11.3	1,359	310,359	850	290,853	1,669	315,130	24.7	1,019	144,317	650	170,813
1899	1,970	539,937	8.7	1,176	270,701	794	269,236	1,431	252,613	1.4	865	115,330	566	137,283
1898	1,754	496,767	13.2	1,056	259,045	698	237,722	1,292	249,079	1.0	796	119,707	496	129,372
1897	1,581	439,012	0.2	978	243,866	603	195,146	1,208	246,541	0.7	736	113,700	472	132,841
1896	1,560	437,972	1.0	978	242,607	582	195,365	1,192	244,815	1.1	731	109,299	461	135,516
1895	1,525	433,502	[3]5.0	951	242,940	574	190,562	1,163	242,264	[3]1.5	712	116,368	451	125,896
1894	1,520	456,359	[3]0.2	938	260,153	582	196,206	1,145	246,001	[3]7.5	688	114,328	457	131,673
1893	1,549	457,422	[3]1.5	955	258,406	594	199,016	1,198	266,020	4.5	728	134,775	470	131,245
1892	1,545	464,620	5.4	945	262,154	600	202,466	1,163	254,623	14.0	705	121,230	458	133,393
1891	1,458	440,858	2.9	880	253,429	578	187,429	1,046	223,266	9.8	619	106,423	427	116,843
1890	1,402	428,392	[3]1.8	851	244,612	551	183,780	996	203,409	[3]10.9	585	90,825	411	112,584
1889	1,392	436,273	.....	866	254,764	526	181,509	1,026	228,409	.....	625	115,586	401	112,823

YEAR.	REGISTERED VESSELS.						
	Total.			Sail.[2]		Steam.	
	Number of vessels.	Gross tonnage.	Annual increase in tonnage (per cent).	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	841	328,908	3.9	590	164,070	251	164,838
1905	748	316,416	0.2	530	149,395	218	167,021
1904	600	315,706	[3]1.7	409	150,341	191	165,365
1903	528	321,126	[3]1.0	335	157,543	193	163,583
1902	491	324,322	11.3	308	172,478	183	151,844
1901	480	291,489	1.9	298	147,787	182	143,702
1900	534	286,082	[3]0.4	334	166,042	200	120,040
1899	539	287,324	16.0	311	155,371	228	131,953
1898	462	247,688	28.7	260	139,338	202	108,350
1897	373	192,471	[3]0.4	242	130,166	131	62,305
1896	368	193,157	1.0	247	133,308	121	59,849
1895	362	191,238	[3]9.1	239	126,572	123	64,666
1894	375	210,358	9.9	250	145,825	125	64,533
1893	351	191,402	[3]8.9	227	123,631	124	67,771
1892	382	209,997	[3]3.5	240	140,924	142	69,073
1891	412	217,592	[3]3.3	261	147,006	151	70,586
1890	406	224,983	8.2	266	153,787	140	71,196
1889	366	207,864	.....	241	139,178	125	68,686

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor. [2] Including barges. [3] Decrease.

Enrolled and licensed vessels attained their highest tonnage in 1906 and their smallest in 1890. In this class for steam vessels the largest tonnage was reported in 1906 and the smallest in 1890, and for sailing vessels the largest in 1905 and the smallest in 1890. The years of most notable increase in the tonnage for the enrolled and licensed vessels were 1900 and 1901, with 62,517 tons and 70,063 tons, respectively. The registered vessels also showed their greatest tonnage in 1906, but their smallest was in 1895. The registered

steamers showed their largest tonnage in 1905 and their smallest in 1896. The sailing vessels of this class reached their greatest tonnage in 1900 and their smallest in 1893. The years 1898, 1899, and 1902 showed the largest increases in the total tonnage of registered vessels, 55,217 tons, 39,636 tons, and 32,833 tons, respectively. When the tonnage of 1906 is compared with that of 1889, the total for all vessels shows an increase of 381,299 tons, or 87.4 per cent. Enrolled and licensed vessels increased 260,255 tons, or 113.9 per cent, and registered vessels increased 121,044 tons, or 58.2 per cent. The number of years when a loss was recorded was greatest for registered vessels, this class showing a decrease for each of eight years compared with three for enrolled and licensed vessels.

WATERS OPERATED UPON.

In making a segregation of the statistics for all vessels of the Pacific coast merchant marine according to the waters upon which they operated in 1906, some difficulty was experienced in properly classifying all the vessels engaged in foreign or coastwise trade, because they frequently engaged in both to a greater or less extent. The division was made, therefore, on the basis of the preponderance of trade the vessel was engaged in during the census year of 1906.

TABLE 23.—NUMBER OF VESSELS, TONNAGE, ETC., BY WATERS OPERATED UPON: 1906.

	NUMBER OF VESSELS.				GROSS TONNAGE.				Horsepower.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).
	Total.	Steam.	Sail.	Unrigged.	Total.	Steam.	Sail.	Unrigged.							
Total	2,537	1,066	666	805	977,687	518,107	305,283	154,297	445,717	$76,622,633	$48,520,139	20,142	$12,950,399	44,189,971	13,301,293
Foreign	86	30	56	.....	262,298	184,373	77,925	.....	150,400	27,805,540	9,690,044	3,858	1,892,298	71,318	880,194
Coastwise	716	306	326	84	460,907	214,116	218,429	28,362	162,313	31,733,214	23,134,520	9,605	6,123,844	576,626	6,217,595
Internal[1]	1,098	443	150	505	141,983	71,695	6,249	64,039	86,537	11,675,760	10,986,487	4,025	3,065,879	40,677,504	2,803,311
Columbia and tributary rivers	237	123	5	109	59,271	28,774	169	30,328	32,133	2,901,718	2,514,523	1,388	873,128	2,581,691	2,098,818
Sacramento river	75	34	4	37	23,304	5,575	119	17,610	4,480	778,200	691,604	323	285,788	74,987	669,821
San Joaquin river	85	39	9	37	22,795	10,309	386	12,100	5,904	1,007,800	1,266,725	686	566,408	140,743	551,487
On both the Sacramento and San Joaquin rivers[2]	18	5	12	1	1,841	794	547	500	725	129,137	89,659	70	43,198	10,038	48,299
All other rivers	52	20	.....	32	2,764	1,406	.....	1,358	1,178	122,345	143,977	93	54,695	57,064	31,768
Pleasure boats	170	66	104	.....	2,524	1,065	1,459	.....	2,047	468,910	2,600	94	45,161	.....	.....

[1] Vessels included under this heading are those operated on waters like Puget Sound, San Francisco bay, and other waters of this character that are not otherwise specifically covered.
[2] The vessels plied on both of these rivers, and therefore the statistics can not be separately credited to either.

TABLE 24.—PER CENT, NUMBER OF VESSELS, TONNAGE, ETC., BY WATERS OPERATED UPON: 1906.

	PER CENT OF TOTAL.														
	Number of vessels.				Gross tonnage.				Horsepower.	Value of vessels.	Gross income.	Number of employees.	Wages.	Number of passengers carried.	Freight carried. (net tons.)
	Total.	Steam.	Sail.	Unrigged.	Total.	Steam.	Sail.	Unrigged.							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Foreign	3.4	2.8	8.4	.....	26.8	35.6	25.5	.....	33.7	36.3	20.0	19.2	14.6	0.2	6.6
Coastwise	28.2	28.7	48.9	10.4	47.1	41.3	71.5	18.4	36.4	41.4	47.7	47.7	47.3	1.3	46.7
Internal[1]	43.3	41.6	22.5	62.7	14.5	13.8	2.0	41.5	19.4	15.2	22.6	20.0	23.7	92.1	21.1
Columbia and tributary rivers	9.3	11.5	0.8	13.5	6.1	5.6	0.1	19.7	7.2	3.8	5.2	6.9	6.7	5.8	15.8
Sacramento river	3.0	3.2	0.6	4.6	2.4	1.1	(2)	11.4	1.0	1.0	1.4	1.6	2.2	0.2	5.0
San Joaquin river	3.4	3.7	1.4	4.6	2.3	2.0	0.1	7.8	1.3	1.3	2.6	3.4	4.4	0.3	4.1
On both the Sacramento and San Joaquin rivers[3]	0.7	0.5	1.8	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	(2)	0.4
All other rivers	2.0	1.9	.....	4.0	0.3	0.3	.....	0.9	0.3	0.2	0.3	0.5	0.4	0.1	0.2
Pleasure boats	6.7	6.2	15.6	.....	0.3	0.2	0.5	.....	0.5	0.6	(2)	0.5	0.3	.....	.....

[1] Vessels included under this heading are those operated on waters like Puget Sound, San Francisco bay, and other waters of this character that are not otherwise specifically covered.
[2] Less than one-tenth of 1 per cent.
[3] The vessels plied on both of these rivers, and therefore the statistics can not be separately credited to either.

In accordance with this division there were 86 vessels engaged wholly, or nearly so, in foreign trade, carrying a total of 880,194 tons of freight; they formed 3.4 per cent of the total number of vessels reported, and carried 6.6 per cent of the total amount of freight. The tonnage, however, of these 86 vessels amounted to 26.8 per cent of the total for vessels of all classes on the Pacific coast, with other features as follows: Horsepower, 33.7 per cent; value, 36.3 per cent; income, 20 per cent; number of employees on vessels, 19.2 per cent; wages, 14.6 per cent; and number of passengers carried, two-tenths of 1 per cent. Of all vessels reported at the census of 1906, the number of those which were at any time during the year carrying freight to foreign ports from the Pacific coast, whether such service represented the whole, the major part, or only a small fraction of the business, amounted to 171 vessels of 348,748 tonnage. These vessels were valued at $34,589,562 and carried 961,382 tons of freight. Thus the additional 85 vessels had a tonnage of 86,450, while the freight carried by them amounted to but 81,188 tons, compared with 880,194 tons for

the 86 which have been classed as engaged wholly in foreign trade. Steamers plying in foreign waters were credited with 35.6 per cent of the tonnage and the sailing vessels with 25.5 per cent.

Coastwise vessels formed the most important class, and were very evenly divided between steam and sail vessels as to number and tonnage. The coastwise vessels are credited with 28.2 per cent of the total number of vessels, 47.1 per cent of the tonnage, 36.4 per cent of the horsepower, 41.4 per cent of the value, 47.7 per cent of the income, 47.7 per cent of the number of employees, 47.3 per cent of the wages, and 46.7 per cent of the tonnage of freight carried. Thus in most of the items the coastwise class represented nearly one-half the totals for all classes combined.

The largest number of vessels in any one class, 1,098, is found in the class operated upon internal waters, which represents those craft plying on Puget Sound, on San Francisco, San Pablo, or San Diego bays, on Grays harbor, and on other similar waters. Following the method of classification used for the foreign vessels, these craft are those whose operations were confined chiefly to such waters. Of these 1,098 vessels, forming 43.3 per cent of all classes, the larger proportion was steam, with a tonnage of 71,695, or 13.8 per cent of the total steam tonnage. The tonnage of the unrigged vessels operated on internal waters formed 41.5 per cent of the tonnage of all unrigged craft, and the sail vessels had a tonnage that was 2 per cent of the tonnage of all sail vessels. The internal class embraced the largest tonnage of unrigged craft, and ranked second for income, number of employees on vessels and their wages, and in tonnage of freight carried. In number of passengers carried this class far outranked all others, as all of the important ferries, except those at Portland, Oreg., are on these waters.

The Columbia and tributary rivers were third in importance. With the exception of number of vessels and amount of wages, the totals for this class were in excess of those for all of the remaining classes combined, ranking fourth in tonnage, horsepower, value of vessels, income, number of employees on vessels, and wages; second in number of passengers carried, because of the ferry across the Willamette at Portland, Oreg.; and third in freight carried. Comparatively little sail tonnage was found on any of the rivers of the Pacific coast, and the steam tonnage and unrigged tonnage were very evenly divided.

There is but little difference between the figures for the number of vessels and the gross tonnage for the Sacramento and the San Joaquin rivers, but the San Joaquin easily had the lead in the other principal items, the differences being as follows: Horsepower, 1,424, or 31.8 per cent; value of vessels, $229,600, or 29.5 per cent; income, $575,121, or 83.2 per cent; number of employees on vessels, 363, or 112.4 per cent; wages, $280,620, or 98.2 per cent; and number of passengers carried, 65,756, or 87.7 per cent. The tonnage of freight carried, however, was less by 118,334 tons, or 17.7 per cent. In addition to the 160 vessels reported as operating on these two rivers there were 18 plying on both whose operations were so interwoven that it was impracticable to properly assign them to either, so they are shown as a separate class in Table 23. They are of less average tonnage than those shown separately for either the Sacramento or the San Joaquin, having a tonnage amounting to only 1,841 and carrying freight amounting to 48,299 tons.

In addition to the rivers for which statistics are shown in the table, a number of rivers have been grouped and styled "all other rivers." This group includes the Chehalis, Coquille, Skagit, Snohomish, and Umpqua, and quite a number of other rivers of less importance. On these rivers are operated 52 vessels having a total tonnage of 2,764, or an average of 53.2 tons per vessel. The tonnage was very evenly divided between steam and unrigged craft, there being no sailing vessels. The craft on these rivers carried 57,064 passengers and 31,768 tons of freight, and had an income of $143,977.

The 170 pleasure boats are included in this table merely to bring the totals to that shown in other tables for the whole Pacific coast fleet. Pleasure boats have no real place in a table of this character, since they may be found in any waters at the option of the owners.

EXPORTS.

The total value of exports of domestic merchandise from the Pacific coast and the proportion carried on American vessels are shown by the report of the Bureau of Statistics.

TABLE 25.—*Exports of domestic merchandise on vessels, for the United States and the Pacific coast: 1906.*[1]

CLASS AND LOCALITY.	Total.	AMERICAN.		FOREIGN.	
		Amount.	Per cent.	Amount.	Per cent.
All vessels.					
United States	$1,534,657,888	$151,339,368	9.9	$1,383,318,520	90.1
Pacific coast	96,748,326	47,200,030	48.8	49,548,296	51.2
San Francisco	39,328,722	25,477,268	64.8	13,851,454	35.2
Puget Sound	45,759,328	20,817,499	45.5	24,941,829	54.5
All other Pacific coast ports[2]	11,660,276	905,263	7.8	10,755,013	92.2
Steam vessels.					
United States	1,489,903,442	141,324,694	9.5	1,348,578,748	90.5
Pacific coast	79,185,041	45,525,739	57.5	33,659,302	42.5
San Francisco	34,405,318	25,181,025	73.1	9,284,293	26.9
Puget Sound	37,797,123	19,908,255	52.7	17,888,868	47.3
All other Pacific coast ports[2]	6,922,600	436,459	6.3	6,486,141	3 9.7
Sailing vessels.					
United States	44,754,446	10,014,674	22.4	34,739,772	77.6
Pacific coast	17,563,285	1,674,291	9.5	15,888,994	90.5
San Francisco	4,863,404	296,243	6.1	4,567,161	93.9
Puget Sound	7,962,205	909,244	11.4	7,052,961	88.6
All other Pacific coast ports	4,737,676	468,804	9.9	4,268,872	90.1

[1] Bureau of Statistics, Department of Commerce and Labor, "Commerce and Navigation of the United States," 1906.
[2] Includes Hawaii.

The exports of domestic merchandise are exclusive of those carried in cars or other land vehicles, which were valued at $183,295,494 for the country as a whole and $4,012,418 for the Pacific coast.

Of the total value of exports of domestic merchandise, only 6.3 per cent was credited to the Pacific coast. There is little doubt that the hauls were longer and the trips less frequent on the Pacific than on the Atlantic coast, but to what extent these factors influenced the small proportion shown is uncertain. On the other hand, of the total value of the exports of domestic merchandise carried on American vessels, 31.2 per cent was carried by American vessels on the Pacific coast. Another view of these exports is significant of the importance of American vessels on the Pacific coast, for whereas American vessels carried 48.8 per cent of the value of all shipments of domestic merchandise from this section, they carried but 9.9 per cent for the country as a whole.

Of the total Pacific coast exports of domestic merchandise, 81.8 per cent was carried on steamers and 18.2 per cent on sailing vessels, which illustrates the importance of the steamer in the foreign trade.

Of the total value of these Pacific coast shipments in American vessels, steamers carried 96.5 per cent of the total value, showing that the steamer has a practical monopoly of the export trade on the Pacific coast so far as American vessels are concerned. The proportions are not nearly so pronounced for foreign vessels on the Pacific coast, the figures being as follows: Steamers, 67.9 per cent; sailing vessels, 32.1 per cent.

The bulk of the exports shipped from the Pacific coast is shown for the ports of San Francisco and Puget Sound, the value for these ports amounting to $85,088,050, or 87.9 per cent, compared with $11,660,276, or 12.1 per cent, for all other ports. Of the total value of all such shipments, Puget Sound ports are credited with 47.3 per cent and San Francisco with 40.7 per cent.

CONGRESSIONAL APPROPRIATIONS.

The first appropriation for the improvement of any of the rivers or harbors of the Pacific coast was made by Congress in 1852, at which time $30,000 were appropriated for building a levee across the mouth of the San Diego river to turn it into its former channel.

Table 26 shows the appropriations for the survey, improvement, and maintenance of the rivers and harbors of the Pacific coast, by periods and by the states in which the various localities improved are situated. In the case of rivers which flow through more than one state or separate two states, it has been impossible to apportion the amount appropriated and the total has therefore been shown under "miscellaneous."

TABLE 26.—*Congressional appropriations for the survey, improvement, and maintenance of harbors and waterways of the Pacific coast, by periods and localities.*

STATE AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS. Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Aggregate	1852	$34,061,782	$10,248,592	$21,204,844	$2,608,346
California	1852	13,374,562	4,128,177	8,792,783	453,602
Alviso harbor	1899	48,000	.....	48,000	.....
Deepwater harbor	1890	65,000	5,000	60,000	.....
Humboldt harbor and bay	1881	2,270,615	422,500	1,765,115	83,000
Mokelumne river	1884	23,000	13,000	7,500	2,500
Napa river	1888	33,929	17,500	16,429	[1]
Oakland harbor	1874	2,949,803	1,534,600	1,347,000	68,203
Petaluma creek	1880	93,239	36,000	34,000	[2] 23,239
Redwood harbor and creek	1884	31,800	23,400	8,400	.....
Sacramento and Feather rivers	1875	957,000	505,000	402,000	50,000
San Diego harbor and river	1852	685,350	172,500	492,850	20,000
San Francisco harbor	1868	424,927	154,927	270,000	.....
San Joaquin river	1876	554,670	258,750	265,920	30,000
San Luis Obispo harbor	1888	368,660	65,000	240,000	63,660
San Pablo bay	1902	353,168	.....	353,168	.....
San Pedro bay	1896	2,707,085	.....	2,707,085	.....
Stockton and Mormon channel	1902	224,316	.....	224,316	.....
Surveys	1886	16,000	16,000	.....	.....
Wilmington harbor	1871	1,568,000	904,000	551,000	113,000
Idaho	1879	37,705	15,000	22,705	.....
Clearwater river	1879	37,705	15,000	22,705	.....
Montana	1896	10,000	.....	10,000	.....
Flathead river	1896	10,000	.....	10,000	.....
Oregon	1871	3,306,100	1,440,050	1,733,050	133,000
Alsea river	1896	3,000	.....	3,000	.....
Clatskanie river	1899	13,000	.....	13,000	.....
Coos bay and harbor	1879	981,640	338,750	642,890	.....
Coos river	1896	16,000	.....	13,000	3,000
Coquille river	1880	386,000	105,000	221,000	60,000
Nehalem Bay harbor	1890	10,000	10,000	.....	.....
Nestucca river	1896	6,000	.....	6,000	.....
Port Oxford harbor of refuge	1882	150,000	150,000	.....	.....
Siuslaw river	1890	187,000	50,000	137,000	.....
Tillamook bay and bar	1888	125,700	5,700	110,000	10,000
Umpqua river	1871	39,500	33,500	6,000	.....
Willamette and Yamhill rivers	1871	676,660	195,500	421,160	60,000
Yaquina bay	1880	710,000	550,000	160,000	.....
Youngs and Klaskuine rivers	1890	1,600	1,600	.....	.....
Washington	1880	3,835,350	111,500	3,124,350	599,500
Chehalis river	1882	19,000	13,000	6,000	.....
Cowlitz river	1880	55,150	19,000	21,150	[3] 15,000
Everett harbor	1894	422,000	.....	422,000	.....
Grays harbor and bar	1896	1,230,000	.....	1,030,000	200,000
Grays harbor and Chehalis river	1892	332,000	.....	155,000	177,000
Grays river	1907	2,500	.....	.....	2,500
Lake Washington canal	1890	480,000	10,000	460,000	10,000
Lewis river	1899	20,350	.....	20,350	[4]
Nasel river	1892	1,500	.....	1,500	.....
New Whatcom harbor	1902	60,000	.....	60,000	.....
Okanogan and Pend d'Oreille rivers	1899	82,500	.....	62,500	20,000
Olympia harbor	1892	147,000	.....	147,000	.....
Puget Sound and its tributaries	1880	335,500	69,500	191,000	75,000
Snohomish river	1905	6,500	.....	6,500	.....
Swinomish slough	1892	205,000	.....	130,000	75,000
Tacoma harbor	1902	375,000	.....	375,000	.....
Willapa harbor and river	1892	61,350	.....	36,350	25,000
Miscellaneous	1866	13,498,065	4,553,865	7,521,956	1,422,244
Colorado river	1884	35,000	25,000	10,000	.....
Columbia river, Cascades canal	1876	3,956,732	1,947,500	2,009,232	.....
Columbia river at its mouth	1878	5,593,424	1,355,000	3,488,180	750,244
Columbia river at Celilo falls	1888	885,000	15,000	650,000	220,000
Columbia river, miscellaneous	1882	[5] 326,000	5,000	279,000	42,000
Columbia and Willamette rivers	1866	2,095,365	880,365	915,000	300,000
Columbia and Snake rivers	1872	496,544	326,000	160,544	10,000
Kootenai river	1896	10,000	.....	10,000	.....
Dredge boats	1907	100,000	.....	.....	100,000

[1] Included with appropriation for Petaluma creek.
[2] Includes appropriation for Napa river.
[3] Includes appropriation for Lewis river.
[4] Included with appropriation for Cowlitz river.
[5] Includes appropriations made for improvements below Tongue point, between mouth of Willamette river and Vancouver, between Wenatchee and Bridgeport, and for gaging.

Of the total appropriation for the improvement of the Pacific coast rivers and harbors, less than one-third was appropriated up to and including 1890. Among the states on the Pacific coast, California led in the amount appropriated by Congress for the betterment of the rivers and harbors within its boundaries. Oakland harbor has received nearly $3,000,000 in appropriations, and San Pedro bay and Humboldt harbor and bay each over $2,000,000. Between the figures shown for this state at the census of 1889 and those shown in this report for the same period there is a difference of $89,927, which was caused by the omission at the former census of appropriations amounting to $94,927 made prior to 1890, and to the erroneous inclusion of $5,000 accredited to San Diego harbor and river.

In the case of other states similar reasons account for many of the differences between the figures of the two censuses. In the case of Oregon, however, the apparent difference is due to the inclusion at the present census under "miscellaneous" of the appropriations for the improvement of the Columbia, Snake, and Willamette rivers, while at the earlier census they were credited to Oregon. This change in the arrangement from the census of 1890 was found necessary because of the impossibility of properly segregating the appropriations for the Willamette and Snake rivers from those for the Columbia river.

Columbia river.—The Columbia river is the largest stream emptying into the Pacific ocean from the United States. In the lower 330 miles of its course it forms the boundary between Oregon and Washington. For the improvement of this river and its tributaries, the Willamette and the Snake rivers, Congress has already appropriated more than $13,000,000, or over one-third the total shown for all the rivers and harbors of the Pacific coast. In order to overcome the falls and rapids between The Dalles and Celilo falls, about 225 miles above the mouth of the Columbia river, Congress has authorized the construction of a continuous canal, about 8.5 miles long, from Celilo falls to Big Eddy. The canal will be 65 feet wide on the bottom and 8 feet deep, and the locks 300 feet long, with a clear width of 45 feet. The estimated cost is about $4,000,000, of which $885,000 has already been appropriated. For a more detailed description of these rivers and the contemplated improvements thereon reference is made to the section of this report on canals and other inland waters.

Lakes Union and Washington.—The connecting of Lakes Union and Washington with Puget Sound by means of a canal has been receiving Congressional attention since 1890. The two lakes are bodies of fresh water in the immediate vicinity of Seattle, Lake Union being entirely within the city limits. Several projects have been contemplated, but up to the present time no plan has been finally adopted, although some excavating has been done along the Shilshole bay route. The rivers and harbors act of March 2, 1907, directed a survey and estimate of cost of a waterway or canal with one lock of sufficient size to accommodate the largest commercial or naval vessels afloat; or, if deemed more advisable, of lesser dimensions. In view of the advantages to commerce should these lakes be connected with Puget Sound it is probable that a suitable canal will be constructed in the near future.

Willamette Falls canal.—The canal and locks were built during the years 1870–72 by the Willamette Falls Canal and Locks Company and were opened for traffic in 1873. They were sold on March 8, 1876, to the Willamette Transportation and Locks Company and again sold in 1892 to the Portland General Electric Company.

By the terms of the state legislative act, dated October 21, 1870, the state could have taken possession in 1893 on payment of their actual value, but unfortunately the option was allowed to lapse.

On March 3, 1899, a board of United States engineers were ordered to examine the locks and report on the desirability of their acquisition by the United States Government. It is from their report that this description is taken.

This board reported in favor of the acquisition, provided the works could be obtained for a reasonable sum. They reported also that they regarded $1,200,000, the price demanded by the present owners, as excessive.

The locks and canal consist of a flight of four locks having a lift of about 10 feet each, a canal basin just above these about 1,250 feet long, and a guard lock 210 feet long connecting this basin with the upper level. An upper entrance about 1,000 feet long makes the total length of the canal, including the locks and entrance, about 3,500 feet.

The lower part of the canal, including four locks, is roughly cut in the solid rock, and wooden fenders are placed at intervals to protect the sides of the vessels passing through the canal.

There is a low dam along the crest of the natural fall, in order to secure an even crest and to raise the water surface probably not over 18 inches or 2 feet.

The following statement shows the results of its operation:

YEAR.	Freight (tons).	Receipts.	Expenditures.	Net earnings.
1898	36,569	$33,880	$5,377	$28,503
1897	30,000	32,480	5,749	26,731
1896	36,512	25,366	4,156	21,210
1895	25,488	28,518	4,355	24,163
1894	29,637	27,530	3,448	24,082
1893	26,288	.....	.....	.....
1892	24,338	.....	.....	.....
1891	30,753	.....	.....	.....
1890	29,687	.....	.....	.....
1889	37,550	.....	.....	.....
1888	38,707	.....	.....	.....
1887	22,560	.....	.....	.....
1886	21,620	.....	.....	.....
1885	36,511	.....	.....	.....
1884	24,663	.....	.....	.....
1883	29,281	.....	.....	.....
1882	13,614	.....	.....	.....

The works are in bad repair and little is being done to improve them. The water in the canal is used for manufacturing purposes to such an extent as to seriously interfere with the usefulness of the canal to navigation. As a waterway this canal leaves much to be desired.

The toll charged during the operation of the canal was at the rate of 50 cents per ton.

The Cascades canal.—Where the Columbia river passes through the Cascade range there is a narrow gorge, in which occur the rapids known as the Cascades of the Columbia. To get around these rapids is the purpose of the canal. The original project for a canal and locks at an estimated cost of $2,544,545, adopted in 1877, was modified in 1888 to include the improvement of the channel below the falls so as to insure an 8-foot channel at all stages, with a lock 462 feet long and 92 feet wide. This project was again modified in 1894 so as to provide for a second lock above the upper lock gates.

The works were partially completed and were opened to navigation in the fall of 1896.

Counting the estimated amount necessary to complete this work, the total cost will be $4,007,260.

The maximum draft that can safely pass the locks is about 7 feet. No tolls are charged.

Statement of operations.

YEAR.	Freight (tons).	YEAR.	Freight (tons).
1903	33,173	1899	17,710
1902	38,501	1898	16,700
1901	19,710	1897	18,812
1900	22,426		

Yamhill river.—The Yamhill river rises in the Coast range and joins the Willamette about 40 miles above its mouth.

In 1896 the construction of a lock and dam was authorized to provide 3½-foot navigation from its junction with the Willamette to McMinnville.

On this work $247,747 was expended up to June, 1903. No tolls are charged.

Statement of operations.

YEAR.	Freight (tons).	YEAR.	Freight (tons).
1904	3,394	1902	1,747
1903	800	1901	2,455

TABLE 27.—ALL VESSELS, BY CLASS,

	CLASS, OCCUPATION, AND OWNERSHIP.	Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
1	Aggregate	2,537	977,687	770,376	837	38	191	.....	435,020	10,697	.....
2	Steam	1,066	518,107	349,403	837	38	191	.....	435,020	10,697	.....
3	Freight and passenger	604	451,270	301,336	455	5	144	.....	355,849	6,333	.....
4	Tugs and other towing vessels	313	24,151	15,290	272	2	39	.....	47,764	2,520	.....
5	Ferryboats	47	40,171	31,018	10	31	6	.....	29,079	86	.....
6	Yachts	66	1,065	764	66	.....	.....	.....	810	1,237	.....
7	All other	36	1,450	995	34	.....	2	.....	1,518	521	.....
8	Individual	320	23,015	15,906	297	2	21	.....	20,082	5,286	.....
9	Freight and passenger	149	19,649	13,766	132	.....	17	.....	16,322	2,390	.....
10	Tugs and other towing vessels	93	1,775	1,053	90	1	2	.....	2,772	1,467	.....
11	Ferryboats	5	507	300	2	1	2	.....	320	71	.....
12	Yachts	57	934	677	57	.....	.....	.....	660	1,057	.....
13	All other	16	150	110	16	.....	.....	.....	8	301	.....
14	Firm	121	14,084	9,540	98	1	22	.....	14,195	1,415	.....
15	Freight and passenger	71	12,326	8,404	52	.....	19	.....	10,804	863	.....
16	Tugs and other towing vessels	39	1,550	996	36	.....	3	.....	3,136	419	.....
17	Ferryboats	2	27	21	1	1	.....	.....	30	15	.....
18	Yachts	5	55	38	5	.....	.....	.....	.....	92	.....
19	All other	4	126	81	4	.....	.....	.....	225	26	.....
20	Incorporated company	609	477,815	321,586	434	32	143	.....	396,249	3,901	.....
21	Freight and passenger	384	419,295	279,166	271	5	108	.....	328,723	3,080	.....
22	Tugs and other towing vessels	172	18,814	11,762	142	1	29	.....	38,517	559	.....
23	Ferryboats	37	38,780	30,027	7	26	4	.....	28,324	.....	.....
24	Yachts	4	76	49	4	.....	.....	.....	150	88	.....
25	All other	12	850	582	10	.....	2	.....	535	174	.....
26	Miscellaneous	16	3,193	2,371	8	3	5	.....	4,494	95	.....
27	Freight and passenger	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Tugs and other towing vessels	9	2,012	1,479	4	.....	5	.....	3,339	75	.....
29	Ferryboats	3	857	670	.....	3	.....	.....	405	.....	.....
30	Yachts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	All other	4	324	222	4	.....	.....	.....	750	20	.....
32	Sail	666	305,283	277,295	.....	.....	.....	.....	.....	.....	.....
33	Freight and passenger	547	302,798	275,060	.....	.....	.....	.....	.....	.....	.....
34	Yachts	104	1,459	1,298	.....	.....	.....	.....	.....	.....	.....
35	All other	15	1,026	937	.....	.....	.....	.....	.....	.....	.....
36	Individual	366	85,227	76,940	.....	.....	.....	.....	.....	.....	.....
37	Freight and passenger	273	83,561	75,426	.....	.....	.....	.....	.....	.....	.....
38	Yachts	85	1,140	1,020	.....	.....	.....	.....	.....	.....	.....
39	All other	8	526	494	.....	.....	.....	.....	.....	.....	.....
40	Firm	99	51,721	47,054	.....	.....	.....	.....	.....	.....	.....
41	Freight and passenger	80	51,336	46,707	.....	.....	.....	.....	.....	.....	.....
42	Yachts	17	273	241	.....	.....	.....	.....	.....	.....	.....
43	All other	2	112	106	.....	.....	.....	.....	.....	.....	.....
44	Incorporated company	187	159,756	145,542	.....	.....	.....	.....	.....	.....	.....
45	Freight and passenger	186	159,745	145,535	.....	.....	.....	.....	.....	.....	.....
46	Yachts	1	11	7	.....	.....	.....	.....	.....	.....	.....
47	All other	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
48	Miscellaneous	14	8,579	7,759	.....	.....	.....	.....	.....	.....	.....
49	Freight and passenger	8	8,156	7,392	.....	.....	.....	.....	.....	.....	.....
50	Yachts	1	35	30	.....	.....	.....	.....	.....	.....	.....
51	All other	5	388	337	.....	.....	.....	.....	.....	.....	.....
52	Unrigged	805	154,297	143,678	.....	.....	.....	.....	.....	.....	.....
53	Individual	120	11,323	9,930	.....	.....	.....	.....	.....	.....	.....
54	Firm	55	7,326	6,919	.....	.....	.....	.....	.....	.....	.....
55	Incorporated company	608	132,833	124,176	.....	.....	.....	.....	.....	.....	.....
56	Miscellaneous	22	2,815	2,653	.....	.....	.....	.....	.....	.....	.....

OCCUPATION, AND OWNERSHIP: 1906.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).	
Iron.	Steel.	Wood.	Composite.		Freight.	Passengers.	All other.					
57	73	2,404	3	$76,622,633	$29,340,102	$10,424,493	$8,755,544	20,142	$12,950,399	44,189,971	13,301,293	1
42	63	959	2	60,440,145	20,600,325	10,414,347	6,272,798	14,423	9,330,294	44,187,184	6,685,007	2
37	49	517	1	52,164,977	20,065,562	8,365,559	1,260,954	11,978	7,281,028	4,631,500	6,673,310	3
4	10	299	.....	3,353,927	534,463	10,208	2,761,267	1,548	1,248,085	22,580	11,657	4
.....	2	44	1	4,315,522	.....	2,037,580	2,170,850	759	708,777	39,532,354	.....	5
.....	1	65	.....	294,800	.....	.....	2,500	66	33,271	.....	.....	6
1	1	34	.....	310,919	300	1,000	77,227	72	59,133	750	60	7
1	2	317	.....	2,912,260	1,318,860	320,117	375,360	1,236	822,125	915,002	614,734	8
1	1	147	.....	2,304,030	1,296,292	296,817	81,413	921	628,382	774,599	606,885	9
.....	.....	93	.....	308,600	22,268	6,064	259,364	225	145,465	17,080	7,789	10
.....	.....	5	.....	22,300	.....	16,236	13,370	16	11,268	122,573	.....	11
.....	1	56	.....	243,300	.....	.....	.....	56	27,225	.....	.....	12
.....	.....	16	.....	34,030	300	1,000	21,213	18	9,785	750	60	13
1	1	119	.....	1,599,400	885,182	178,902	240,839	698	510,006	545,008	419,673	14
.....	1	70	.....	1,327,550	876,717	172,580	14,738	528	386,727	449,569	419,313	15
.....	.....	39	.....	223,350	8,465	2,895	214,248	155	111,554	3,500	300	16
.....	.....	2	.....	3,500	.....	3,427	1,849	3	2,800	91,939	.....	17
.....	.....	5	.....	14,500	.....	.....	2,500	4	1,420	.....	.....	18
1	.....	3	.....	30,500	.....	.....	7,504	8	7,505	.....	.....	19
40	60	507	2	55,560,485	18,396,283	9,915,328	5,532,867	12,377	7,911,038	41,571,174	5,650,600	20
36	47	300	1	48,533,397	17,892,553	7,896,162	1,164,803	10,529	6,265,919	3,407,332	5,647,112	21
4	10	158	.....	2,642,977	503,730	1,249	2,165,923	1,101	949,067	2,000	3,488	22
.....	2	34	1	4,254,722	.....	2,017,917	2,155,631	715	669,809	38,161,842	.....	23
.....	.....	4	.....	37,000	.....	.....	.....	6	4,626	.....	.....	24
.....	1	11	.....	92,389	.....	.....	46,510	26	21,597	.....	.....	25
.....	.....	16	.....	368,000	.....	.....	123,732	112	87,125	1,156,000	.....	26
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27
.....	.....	9	.....	179,000	.....	.....	121,732	67	41,979	.....	.....	28
.....	.....	3	.....	35,000	.....	.....	.....	25	24,900	1,156,000	.....	29
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30
.....	.....	4	.....	154,000	.....	.....	2,000	20	20,246	.....	.....	31
12	8	645	1	11,533,171	8,090,122	10,146	199,483	4,481	2,719,571	2,787	3,437,372	32
12	8	527	.....	11,275,586	8,090,007	10,146	177,026	4,401	2,683,528	2,787	3,437,197	33
.....	.....	104	.....	174,110	.....	.....	100	28	11,890	.....	.....	34
.....	.....	14	1	83,475	115	.....	21,757	52	24,153	.....	175	35
.....	.....	366	.....	3,455,600	2,586,972	1,145	72,158	1,636	964,470	2,550	1,053,828	36
.....	.....	273	.....	3,268,725	2,586,857	1,145	50,301	1,588	945,397	2,550	1,053,653	37
.....	.....	85	.....	145,400	.....	.....	100	23	9,570	.....	.....	38
.....	.....	8	.....	41,475	115	.....	21,757	25	9,503	.....	175	39
1	1	97	.....	1,934,565	1,318,831	300	14,399	748	496,254	4	377,644	40
1	1	78	.....	1,897,655	1,318,831	300	14,399	738	490,874	4	377,644	41
.....	.....	17	.....	22,910	.....	.....	.....	5	2,320	.....	.....	42
.....	.....	2	.....	14,000	.....	.....	.....	5	3,060	.....	.....	43
11	7	169	.....	5,866,206	4,024,889	8,701	100,470	1,978	1,192,927	233	1,950,015	44
11	7	168	.....	5,861,206	4,024,889	8,701	100,470	1,978	1,192,927	233	1,950,015	45
.....	.....	1	.....	5,000	.....	.....	.....	.....	.....	.....	.....	46
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47
.....	.....	13	1	276,800	159,430	.....	12,456	119	65,920	.....	55,885	48
.....	.....	8	.....	248,000	159,430	.....	12,456	97	54,330	.....	55,885	49
.....	.....	1	.....	800	.....	.....	.....	.....	.....	.....	.....	50
.....	.....	4	1	28,000	.....	.....	.....	22	11,590	.....	.....	51
3	2	800	.....	4,649,317	649,655	.....	2,283,263	1,238	900,534	.....	3,178,914	52
.....	.....	120	.....	217,405	61,030	.....	188,055	150	89,730	.....	195,113	53
.....	.....	55	.....	144,360	21,845	.....	131,055	58	40,183	.....	200,805	54
3	2	603	.....	3,808,324	566,780	.....	1,751,902	878	661,612	.....	2,782,996	55
.....	.....	22	.....	479,228	.....	.....	212,251	152	109,009	.....	.....	56

GREAT LAKES AND ST. LAWRENCE RIVER

GREAT LAKES AND ST. LAWRENCE RIVER.

By JOSEPH D. LEWIS.

This section of the report covers the statistics of water transportation in 1906 for American vessels operating on Lakes Superior, Michigan, Huron, St. Clair, Erie, and Ontario, and on the St. Lawrence river, including all documented and undocumented craft of 5 tons net register or over except fishing vessels and vessels owned by the Federal Government.

The physical features of the lakes and the surrounding country, and the history of lake navigation and shipbuilding, have been discussed at some length in previous Census reports and in the reports of other Government offices, and will not be considered here except when necessary.

To obtain a thorough comprehension of the import of the statistics, and to avoid error in the analysis of the various statistical tables, an understanding of the schedules, instructions, and general explanations given in the general summary for the United States is needful.

It should be stated at the outset that the statistics as to the number of vessels and their gross and net tonnage do not agree with those contained in the report of the Bureau of Navigation for the year ending June 30, 1906. The total number of vessels reported by that bureau for the "Northern Lakes," excluding those on Lake Champlain, for the year indicated was 2,565, with a gross tonnage of 2,182,635, 425 vessels and 210,228 tons less than the Census figures. These differences arise partly from the fact that the reports of the two offices do not cover the same periods of time, and partly from the difference in the scope of the reports. The reports of the Bureau of Navigation take cognizance only of documented craft. Some of these were engaged in fishing, some had been destroyed, while others were idle during the entire year, and therefore not included in the Census report. Some craft, too, were operated on the Great Lakes only a small portion of the year, while others operated exclusively on other waters; these, although credited to the Great Lakes by the Bureau of Navigation, if documented there, are assigned in the Census statistics to the waters in which they operated, either exclusively or for the longest period. On the other hand, following the navigation laws the statistics of the Bureau of Navigation do not include—

> Yachts, nor boats and lighters, decked and not masted, employed within the harbor of any town or city, nor canal boats and barges without sails or internal motive power of their own, employed wholly upon canals or the internal waters of a state, nor barges and boats plying on rivers or lakes of the United States and not engaged in trade with contiguous foreign territory, and not carrying passengers, nor boats under 5 tons net.[1]

All of these craft, however, except those under 5 tons net register, are included in the Census returns. In any comparisons of the statistics of the two offices, therefore, it will be necessary to bear in mind the differences that have just been indicated.

In previous Census reports and to some extent in the reports of the Bureau of Statistics it has been customary to publish statistics of vessels and water transportation by ports of registration. This method of presentation has not been followed at the present census. The ownership of vessels so frequently has no relation to their field of operations that a statistical presentation of number of vessels, tonnage, value, etc., by ports, would have little significance, and on the other hand would often prove misleading. Very many of the returns for vessels having regular routes of travel show that the home port where the document was issued differed from the terminal points of the vessel's trips. For example, a large steamer owned at Mackinac Island and registered at Marquette was leased to a company which sailed it on Lake Ontario between Lewiston and Alexandria Bay, and such cases, instead of being exceptional, are very numerous. Moreover, in the reports made for the Census, instances have been noted of vessels which were owned and registered at lake ports but which were engaged in coastwise commerce on the Atlantic ocean. The following extract from the report on the Great Lakes at the census of 1889 describes the method employed at that time:

> In the case of the Great Lakes and St. Lawrence river it has been found advisable to make allotment of the statistics of equipment to what may be called the ports of frequent hail, and the statistics of traffic to the ports where records of business are kept.

[1] Annual report of the Commissioner of Navigation, 1906, page 282.

The question of local taxation has a strong bearing upon this point, as there is little uniformity between the different states and cities in the taxation of floating property. In some localities vessels are wholly exempt, and in others are heavily taxed; and as a result of this inequality between ports nominal transfers of ownership frequently occur, which are in a sense fictitious, and are sometimes resorted to merely for the purpose of evading the payment of taxes.

For similar reasons the general statistics are not presented by lakes, as was done at the census of 1889. A large proportion of the shipping is engaged in interlake commerce, as, for example, the iron ore fleet sailing from Duluth or Superior to ports on Lake Erie, and a statistical presentation by lakes of the number of vessels, tonnage, value of vessels, employees, etc., would be utterly without meaning.

In reference to the omission of vessels of less than 5 tons, it was obviously impracticable to include them in the enumeration on account of the large number of such craft and the difficulty of reaching their owners. The waters adjacent to large cities and summer resorts fairly swarm in the season with boats of this character, and while the large majority are pleasure craft, many are engaged in transporting freight and passengers on a small scale. The following is an extract from a letter written by one of the special agents of the Office while he was engaged in the canvass:

> It is estimated that there are upward of 3,000 naphtha launches under 5 tons on the St. Lawrence river. Most of them carry freight and passengers. For instance, the launch I went in from Clayton to Alexandria Bay carried six passengers beside myself, 2,000 or 3,000 feet of lumber, several bushels of coal, and quite an assortment of groceries. This is an everyday occurrence. The tonnage of these boats in the aggregate amounts to quite a large figure. People on the river are patronizing them in preference to the regulars because they will land goods and passengers at any point on the river desired. More of these boats are being built this season than last, but only a few are over 5 tons.

The canvass of this district, as in the other districts of the country, was based almost entirely upon a list of vessels prepared from the reports of the Bureau of Navigation of the Department of Commerce and Labor, supplemented by such other lists of vessels as were available. Following a canvass by mail, special agents were sent into the field, and seven of these agents were assigned to the Lake district and distributed among the most important ports. The work of collecting reports by agents was commenced about the first of February, sometime previous to the opening of interlake navigation, as it was considered of advantage to reach the owners and operators of vessels at their home ports, where they were generally to be found during the closed season. The canvass was finished by the end of April. There were only 9 vessels, with a gross tonnage amounting to 978, for which no information of any kind could be secured. All other listed vessels were satisfactorily disposed of by the receipt either of a report or of information which made it unnecessary to report. It is believed that within the limitations above stated the results are complete, and that the statistics present an accurate showing of the operations of lake craft during the period covered by the census.

With the exception of a special report on steam navigation at the census of 1880, there had been no statistics of water transportation published by the Census Office prior to those for 1889. The greater part of the statistics for 1880 was not the result of an actual enumeration by agents of the Census but was taken from the records of the United States Steamboat Inspection Service and other offices, public and private.[1] Owing to differences in the methods of compilation it is impossible to state with exactness the extent to which the figures for 1906 are comparable with those for prior censuses. As an example of such differences between 1880 and 1906 the following statement may be cited from the report for 1880:

> In the foregoing tables this steamboat property has been assigned to the states where it was owned in 1880. In cases where the ownership was obscure or divided the legal headquarters or the address of the managing owner was taken as authority for assigning the craft to a state, but very few of these perplexing cases were found. The Pacific Mail Steamship Company, owned in New York, but operating lines from San Francisco, under this ruling was assigned to the state of New York.[2]

The same practice appears to have been followed at the census of 1889, the statistics of equipment, income, and expenditure having been credited to the port of registration, while the freight and passenger movement was charged to the port from which the vessel was operated.

At the present census, however, all the statistics have been assigned to the waters on which the vessel was operated. These differences in method must therefore be kept in mind in all comparisons between the statistics of the present census and those for prior censuses.

Owing to the lack of Census statistics relative to water transportation prior to 1880 it will frequently be necessary in the discussion of the subject to present statistical tables from the reports of other departments of the Government.

A comparative statement of the statistics as reported at the censuses of 1889 and 1906 is presented in Table 1.

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[1] Tenth Census. Transportation, page 657.

[2] Ibid., page 717.

TABLE 1.—ALL VESSELS AND CRAFT ON THE GREAT LAKES AND ST. LAWRENCE RIVER: 1906 AND 1889.

[In addition to the craft reported in this table there were 197 craft of 41,437 gross tons reported as idle in 1906. The report of the Bureau of Fisheries shows that in 1903 there were 206 fishing and transporting vessels, valued at $690,450, and 3,170 boats and gasoline launches, valued at $317,060, engaged in the fishing industry on the Great Lakes. Craft of this character are not included in the table.]

	TOTAL.			STEAM.[1]			SAIL AND UNRIGGED.		
	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels	2,990	2,737	9.2	1,676	1,467	14.2	1,314	1,270	3.5
Gross tonnage	2,392,863	920,294	160.0	1,915,786	595,813	221.5	477,077	324,481	47.0
Value of vessels	$130,805,640	$48,580,174	169.3	$116,983,812	$40,868,824	186.2	$13,821,828	$7,711,350	79.2
Gross income	$65,274,702	$35,463,852	84.1	$56,340,227	$24,949,267	125.8	[2] $8,934,475	$10,514,585	[3] 15.0
Number of employees	24,916	22,726	9.6	20,515	15,271	34.3	4,401	7,455	[3] 41.0
Wages	$13,280,716	$8,098,191	64.0	$11,179,882	$5,796,895	92.9	$2,100,834	$2,301,296	[3] 8.7
Number of passengers carried	14,080,146	2,235,993	529.7	14,080,146	2,235,993	529.7	.....	.....	.....
Freight shipments (net tons)	[4] 75,609,649	25,266,974	199.2	[5]	[5]	.....	[5]	[5]	.....

[1] Includes all craft propelled by machinery.
[2] In a number of cases the income for unrigged craft was credited to the towing steamers.
[3] Decrease.
[4] Bureau of Statistics, Department of Commerce and Labor, Monthly Summary, Internal Commerce of the United States, December, 1906, and includes 2,003,453 net tons of bunker coal.
[5] Not reported separately.

In order that the comparison may be carried back to 1880 with respect to certain items concerning transportation by steam vessels, the following table containing statistics published at that census is introduced:

TABLE 2.—*Steam navigation, Northern Lakes: 1880.*[1]

Number of steamers	947
Tonnage	222,290
Value of steamers	$13,918,925
Capital invested	$16,978,108
Gross earnings	$12,136,228
Crews, persons	9,143
Paid for services	$3,293,964
Passenger traffic, number	1,356,010
Freight traffic, tons	4,368,171

[1] Tenth Census, Transportation, page 702.

The statistics in the foregoing tables and others in this section and in the general report on water transportation in the United States indicate the extraordinary development that has taken place in the commerce of the Great Lakes. It can be stated indeed that this growth exceeds that of the water-borne commerce on any other of the great systems in the country, with the exception of the Atlantic coast. Among the causes contributing to this development are the immense increase of the population in the territory tributary to these inland seas; the resources and productiveness of the country in such great staples as iron ore, wheat, corn, etc., of which by far the major proportion must find markets elsewhere; and the generous expenditures for the improvement of harbors and canals, in deepening and widening the channels of communication, and in the construction of dock and wharf facilities.

Great Lakes compared with United States.—The statistics for the lakes are compared with those for the United States in Table 3.

The different items included in the table vary as to the accuracy with which they indicate the comparative economic importance of different transportation divisions. The number of passengers and quantity of freight carried are defective standards of comparison unless the passenger and ton mileage are also considered. To secure this information was a task that the Bureau of the Census did not undertake, and could not have accomplished with the means at hand and the time at its disposal. Vessel tonnage is also defective as a basis of comparison, as is shown by the fact that the gross tonnage of shipping on the Mississippi river, which is made up almost entirely of coal barges of cheap construction, many of which are destroyed after the first trip, is nearly twice that on the lakes, although the earnings of lake shipping are nearly four times those on the Mississippi.

For these reasons the capital invested, the income earned, and the number of men employed and wages paid form the best basis by which to judge the comparative importance of different transportation systems. Gauged by these standards, the shipping interests on the Great Lakes represent from one-sixth to one-fourth of the totals for the United States, the percentages varying from 17.7 per cent of the total for the number of men employed to 25.8 per cent for value of vessels. The relatively high proportion, 18.6 per cent, which the gross tonnage of lake vessels represents of the total gross tonnage for the United States, as compared with the corresponding proportion, 8 per cent, for the number of craft, indicates that the average tonnage per vessel on the lakes is much greater than for the country as a whole; the average value per ton, also, is much higher.

TABLE 3.—*Water transportation, United States and the Great Lakes: 1906.*

	United States.	Great Lakes.	Per cent of total.
Number of vessels	37,321	2,990	8.0
Gross tonnage	12,893,429	2,392,863	18.6
Value of vessels	$507,973,121	$130,805,640	25.8
Gross income	$294,854,532	$65,274,702	22.1
From freight	$175,545,361	$52,076,533	29.7
From passengers	$43,645,365	$4,866,904	11.2
From all other sources	$75,663,806	$8,331,265	11.0
Number of employees	140,929	24,916	17.7
Wages	$71,636,521	$13,280,716	18.5
Number of passengers carried	366,825,663	14,080,146	3.8
Freight carried (net tons)[1]	177,519,758	[2] 75,609,649	42.6

[1] Exclusive of harbor work.
[2] Bureau of Statistics, Department of Commerce and Labor, Monthly Summary, Internal Commerce of the United States, December, 1906, and includes 2,003,453 net tons of bunker coal.

Undocumented craft.—It has already been pointed out that the omission of undocumented vessels from the statistics of the Bureau of Navigation impairs their value for comparison with the Census figures. The classes of vessels which are not required to be documented are described elsewhere in this report. The extent to which such vessels were reported for the Census is shown in Table 4.

TABLE 4.—*Number and gross tonnage of active and idle undocumented craft: 1906.*

CLASS.	Number of vessels.	Gross tonnage.
Total	775	159,351
Active	748	150,363
Steam	124	5,984
Sail	49	408
Unrigged	575	143,971
Idle	27	8,988
Steam	3	104
Sail	2	260
Unrigged	22	8,624

A large proportion of the undocumented steam vessels are small gasoline launches used for private purposes, and practically all the sailing vessels are operated for the same purpose. The unrigged craft are made up largely of vessels employed in harbor work, dredging, etc., such as scows, barges, lighters, derricks, pile drivers, and dredges.

CHARACTER OF SHIPPING.

The development of water transportation on the Great Lakes has naturally been attended by change and improvement in the types of vessels engaged in this commerce. The transition of lake shipping from the old to the new exhibits much the same aspects of change as in other fields of maritime commerce. The propulsive power is gradually passing from sail to steam, while the material of construction shows a steadily increasing proportion of steel. The average tonnage per vessel, except for unrigged vessels, has steadily grown larger.

Steam, sail, and unrigged craft.—In order to show the relative proportions of steam, sail, and unrigged vessels engaged in lake commerce, as reported at the censuses of 1889 and 1906, Table 5 is introduced, and following that Table 6, compiled from the reports of the Bureau of Navigation, Department of Commerce and Labor, which shows for a longer period of time the gradual evolution of this branch of American shipping. It should be stated that "steam vessels" include all classes of power craft—steam, gasoline, electric, etc.

TABLE 5.—*Number, gross tonnage, and value of different classes of vessels: 1906 and 1889.*

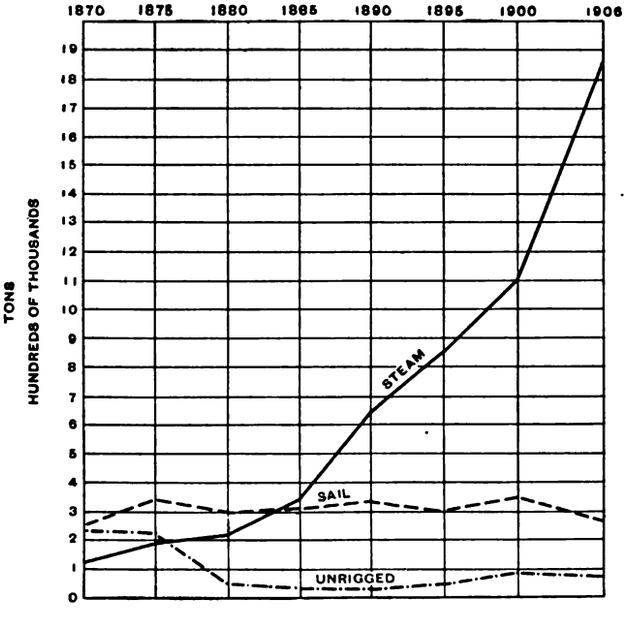
CLASS.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Average tonnage per vessel.	Average value per ton.
Total	1906	2,990	2,392,863	$130,805,640	800	$55
	1889	2,737	920,294	48,580,174	336	53
Steam	1906	1,676	1,915,786	116,983,812	1,143	61
	1889	1,467	595,813	40,868,824	406	69
Sail	1906	531	265,571	7,135,271	500	27
	1889	962	185,081	4,238,850	192	23
Unrigged	1906	783	211,506	6,686,557	270	32
	1889	308	139,400	3,472,500	453	25

TABLE 6.—*Number and gross tonnage of different classes of vessels, with average tonnage per vessel: 1870 to 1906.*[1]

YEAR.	STEAM.			SAIL.			UNRIGGED.		
	Number of vessels.	Gross tonnage.	Average tonnage per vessel.	Number of vessels.	Gross tonnage.	Average tonnage per vessel.	Number of vessels.	Gross tonnage.	Average tonnage per vessel.
1906	1,824	1,838,136	1,008	511	268,585	526	230	75,914	330
1900	1,719	1,106,842	644	813	333,906	411	233	82,109	352
1895	1,737	854,018	492	1,066	298,297	280	157	48,649	310
1890	1,507	648,725	430	1,236	326,077	264	174	29,301	168
1885	1,154	332,365	288	1,282	310,383	242	198	41,876	211
1880	912	209,465	230	1,415	302,264	214	202	45,766	227
1875	869	197,073	227	1,645	335,822	204	2,075	238,740	115
1870	625	136,980	219	1,545	254,819	165	2,384	237,287	100

[1] Reports of the Commissioner of Navigation, 1885 and subsequent years, and "Commerce and Navigation of the United States," Treasury Department, 1880 and preceding years.

DIAGRAM 1.—*Relative amount of tonnage, steam, sail, and unrigged vessels: 1870 to 1906.*



As shown by the above statistics the sailing vessels of the lakes are steadily diminishing in importance,

indeed to a much greater degree than is indicated in the tables. There is a class of vessels included under the classification of sailing vessels which are commonly called "schooner barges," and which in reality operate as barges; that is to say, they are towed between ports, but are equipped with masts and canvas to provide against breaking towlines or other accidents. While the returns do not make clear the exact proportion of the entire fleet which this class forms, it is certain that this proportion is considerable. A careful examination of the returns of the present census shows that there were at least 117 schooner barges on the Great Lakes, with a gross tonnage of 160,002, and a value of $5,273,884; an average tonnage per vessel of 1,368, and an average value per gross ton of $33.

The largest navigation company on the lakes, in reference to the vessels of this class which formed a part of its fleet, stated:

> The sailing vessels are nothing more than tow barges that have masts on which sails can be rigged if necessary, although they are of the same nature as the barges called "pigs" which carry no masts, and we think the figures for sailing vessels and unrigged craft should be combined as tow barges.

The recommendation of the company was followed and its "sailing fleet" classified as unrigged craft or barges. There were, perhaps, many other craft of this class returned as sailing vessels, but there was nothing in the reports to indicate their exact character. It should be stated that "rigged barges" are classified as sailing craft by the Bureau of Navigation in its List of Merchant Vessels of the United States and by the Lake Carriers' Association in its annual reports, although in the annual report of the Commissioner of Navigation for 1905 a statement showing the number and tonnage of seagoing schooner barges is given. The following extract from that report accurately defines these vessels:[1]

> A seagoing schooner barge is a vessel usually towed from port to port, but rigged with masts and furnished with sails, so that if in emergency she breaks adrift from the towing steamer, she may not be helpless at sea. Nearly all of these schooner barges before 1890 were square-rigged vessels or schooners which had outlived their usefulness as such and were dismantled and converted into barges. Shortly before 1890, and to a considerable extent since, such schooner barges have been specially constructed, some of them with steel hulls. The practice of cutting down square-rigged vessels and schooners into barges still continues.

Owing to the confusion as to the classification of schooner barges it can not be stated with certainty that the statistics for this class as presented separately are complete, but the 117 schooner barges already referred to represent over one-half of the total gross tonnage and over two-thirds of the total value of sailing vessels on the Great Lakes, as reported in Table 5 for 1906. If these schooner barges are deducted, there are left 414 sailing vessels, with a total gross tonnage of 105,569.

[1] Report of the Commissioner of Navigation, 1905, page 195.

An official of the United States Steamboat Inspection Service, whose experience in navigating the lakes extends back for nearly fifty years, in conversation with the writer, described Buffalo harbor and river as crowded with sailing vessels forty years ago, with only occasional steamers, and this at that time was the condition in all lake ports. Since that time, however, sailing ships have been gradually disappearing from the lakes, probably for the reason that they are unequal to the competition of the large modern steamers in freight traffic. Some of these sailing vessels have been reconstructed into barges, many have been wrecked, and others are laid up as useless. Many of the sailing vessels now in commission are practically "tramps," picking up occasional cargoes of posts, cord wood, stone, etc., for short voyages. Others are engaged in business of a speculative character, purchasing farm produce for sale in city markets. Taken as a whole their work is spasmodic and unreliable. By far the largest proportion of sailing vessels remaining on the Great Lakes, however, are operated in the lumber trade on Lake Michigan, although there are many in commission on the other lakes. By reference to Table 41, in which are presented the detailed statistics, it will be seen also that in the sailing fleet there are 122 pleasure craft or yachts, with a gross tonnage amounting to 1,458.

It was the original intention to ascertain in the canvass the manner in which sailing vessels were rigged, whether as schooner, brig, barkentine, etc., and the number of each type; this, however, was not attempted, but it can be stated that practically all sailing vessels on the lakes are of the schooner type or its modifications.

The decadence in the tonnage of sailing vessels has been accompanied by an enormous increase in that of steamers, and the explanation lies almost entirely in the immense development of the traffic in iron ore, coal, grain, and other important commodities. The tonnage of the iron ore carried by lake shipping in 1906 was alone over one and one-half times the total tonnage of all freight carried on these waters in 1889. From 1889 to 1906 the gross tonnage of steam vessels increased 221.5 per cent and of unrigged craft 51.7 per cent. It would appear, however, that within the last few years the use of unrigged vessels in interlake traffic has been decreasing. The following extract from a public document is of interest in this connection:[2]

> Turning to the Great Lakes, it is found that the use of barges there also is on the decline. Of the freight which passed through the locks of the Sault Ste. Marie in the years from 1888 to 1899, inclusive, nearly one-third was carried in barges, the percentages varying in different years from 26 to 33. In the year 1904 only 18 per cent was carried in barges. * * * Very few, if any, new barges are being built for the lake trade, all new vessels, as a rule, being made self-propelling.

[2] Report by the Mississippi River Commission, H. R. Doc. No. 263, Fifty-ninth Congress, 1st session, pages 14 and 15.

The fact that from 1901 to 1905 the reports of the Bureau of Navigation show a steady relative decline in the number and tonnage of unrigged vessels, documented, appears to support this view; some craft of this class are, however, reported as constructed every year, although these additions are not enough, evidently, to make up for the annual loss.

Table 6, covering as it does a longer period of time than the Census figures, discloses more plainly the enormous growth in steam tonnage—from 136,980 tons in 1870 to 1,838,136 in 1906, over thirteenfold. The increase in unrigged vessels is much less striking. In explanation of the very great difference in the statistics of unrigged vessels between 1875 and 1880 and the later years it should be stated that prior to April 18, 1874, the navigation laws were construed as applying to canal boats and requiring that they be documented, but on that date an act of Congress became effective which provided that—

> the act to which this is a supplement shall not be so construed as to extend the provisions of the said act to canal boats, or boats employed on the internal waters or canals of any state; and all such boats, excepting only such as are provided with sails or propelling machinery of their own adapted to lake or coastwise navigation, and excepting such as are employed in trade with the Canadas, shall be exempt from the provisions of the said act, * * *

This legislation had the immediate effect of dropping from the list of documented vessels a very large number of canal boats which were registered at lake ports.

It will be seen by reference to Table 41 that power vessels were principally steamers, the horsepower of which amounted to 976,847; the others were gasoline boats, aggregating 5,700 horsepower, nearly all pleasure craft, and one yacht of 8 horsepower, electric. According to the reports received, 1,616 of these vessels were equipped with screw propellers, 51 were side wheel steamers, 8 were stern wheelers, and 1 was a "chain" ferryboat. At the census of 1889 there were 62 side wheel passenger steamers reported, with a gross tonnage of 27,259; thus there has been a decrease in the number of these vessels. There were no stern wheel vessels reported at that census, although some were probably in use. According to authoritative works on the subject of lake navigation the first propeller steamer on the lakes appeared in 1841.[1] At the present time boats of other types are in comparison numerically insignificant.

Metal and wooden vessels.—Fully as remarkable, perhaps, as the great change noted in the method of propulsion of lake vessels is the revolution in the materials used in their construction, which is indicated in Tables 7 and 8.

[1] Eleventh Census, Transportation Business, Part II, page 247.

TABLE 7.—*Number, gross tonnage, and value of vessels, by character of construction: 1906 and 1889.*

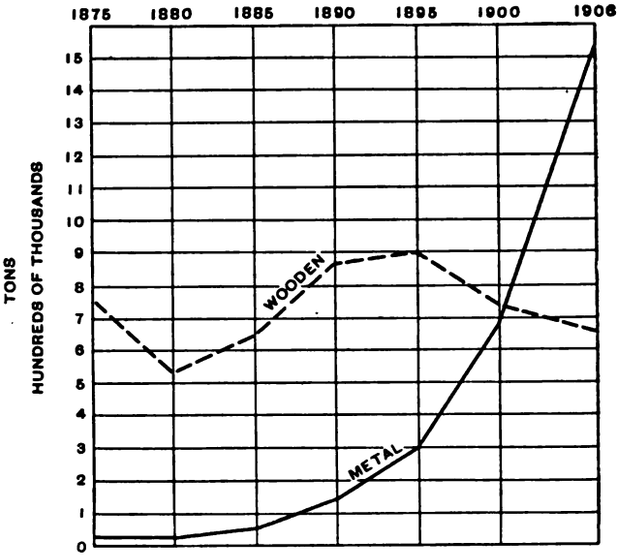
CHARACTER OF CONSTRUCTION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Average tonnage per vessel.	Average value per ton.
Total	1906	2,990	2,392,863	$130,805,640	800	$55
	1889	2,737	920,294	48,580,174	336	53
Iron	1906	33	27,827	2,025,050	843	73
	1889	45	35,922	3,225,224	798	90
Steel	1906	539	1,606,326	103,704,366	2,980	65
	1889	40	75,488	7,349,000	1,887	97
Wood	1906	2,391	737,386	24,075,474	308	33
	1889	2,641	794,128	36,777,950	301	46
Composite	1906	27	21,324	1,000,750	790	47
	1889	11	14,756	1,228,000	1,341	83

TABLE 8.—*Number and gross tonnage of metal and wooden vessels, with average tonnage per vessel: 1875 to 1906.*[1]

YEAR.	METAL.			WOODEN.		
	Number of vessels.	Gross tonnage.	Average tonnage per vessel.	Number of vessels.	Gross tonnage.	Average tonnage per vessel.
1906	543	1,526,506	2,811	2,022	656,129	324
1900	318	686,675	2,159	2,447	836,182	342
1895	190	300,648	1,582	2,770	900,316	325
1890	88	127,926	1,454	2,829	876,177	310
1885	34	34,028	1,001	2,600	650,596	250
1880	18	15,973	887	2,511	541,522	216
1875	16	15,585	974	4,573	756,050	165

[1] Reports of the Commissioner of Navigation, 1885 and subsequent years, and "Commerce and Navigation of the United States," Treasury Department, 1875 and 1880.

DIAGRAM 2.—*Relative amount of tonnage of metal and wooden vessels: 1875 to 1906.*



It is hardly necessary to explain that the classification into iron, steel, wood, and composite vessels is used solely with reference to the construction of the hull. The salient facts apparent from the tables are that iron

ships are gradually becoming obsolete; that steel is the principal material used in the construction of vessels of large tonnage; that wooden vessels have decreased in number, tonnage, and value; and that this class of construction is being confined to comparatively small vessels. It is possible that the statistics relating to vessels of composite construction are not strictly accurate, owing to the confusion which exists as to the precise meaning of the term when applied to shipping; that is, as to the proportion of the different materials used which entitle vessels to be so classified. In the reports of the Bureau of Navigation they are included in the metal class, and are so reported in Table 8. The explanation made on page 124 for the great decrease in unrigged vessels between 1875 and 1880 applies also to the decrease in the number of wooden vessels shown in Table 8 for 1880 as compared with 1875.

In the early days of iron shipbuilding, while the future possibilities were vaguely descried by some, there were many who could see no good in iron as applied to the art of shipbuilding, and many objections were advanced, which appear ridiculous in the light of present developments. But even those most sanguine of success could hardly have foreseen the great supremacy in tonnage eventually to be attained by metal ships over those built of wood. Their efficiency was questioned, their longevity as compared with wooden vessels was doubted, it was averred that lacking buoyancy they would sink too easily and rapidly, and that their effect upon the compass was dangerous. Their merits, however, were soon demonstrated. Their greater strength and carrying capacity when compared ton for ton with wooden ships were the chief factors in their favor, and proved sufficient to insure a constant increase in the tonnage of this class of vessels.

Iron and steel have not been used long enough as a material in shipbuilding to determine with certainty the extreme length of service of which such vessels are capable. It has been observed that there are some metal ships, built in the earliest days of such construction on the lakes, still in commission. The real veteran ships of the service, however, on the lakes, as elsewhere, are constructed of wood. In this connection a tabular statement setting forth some of the leading features of a few of the older ships is of some interest. The vessels included in this statement are all made of wood.

The oldest vessels included in the statement are the sailing ships; while those built later, all in 1862, are screw propellers. All are in active operation, except two, which were reported as out of commission in 1906. The *Empire State*, the largest vessel in the group, is constantly engaged in carrying passengers and freight between Chicago, Milwaukee, and Racine.

Statement of the old vessels engaged in transportation on the Great Lakes.

NAME OF VESSEL.	Year built.	Propulsive power.	Home port.	Gross tonnage.	Class of business.
Lydia E. Raesser	1847	Sail	Milwaukee, Wis.	131	Freight.
Seaman	1848	Sail	Milwaukee, Wis.	181	Freight.
Josephine Dresden	1852	Sail	Milwaukee, Wis.	84	Freight.
Challenge	1852	Sail	Milwaukee, Wis.	87	Out of commission.
Plymouth	1854	Sail	Cleveland, Ohio	776	Freight.
Empire State	1862	Steam, screw.	Milwaukee, Wis.	1,116	Freight and passenger
Monitor	1862	Steam, screw.	Buffalo, N. Y.	45	Towing.
Success	1862	Steam, screw.	Chicago, Ill	26	Towing.
Badger State	1862	Steam, screw.	Port Huron, Mich.	802	Freight.
Kate Williams	1862	Steam, screw.	Marquette, Mich.	164	Out of commission.

Tonnage.—Table 9 gives statistics in regard to the number, tonnage, and value of vessels, classified according to the material used in their construction, for steam, sail, and unrigged craft, and schooner barges; and also the horsepower of the engines in steamers.

TABLE 9.—*Number of vessels, tonnage, horsepower of engines, and value, by character of construction and class: 1906.*

CHARACTER OF CONSTRUCTION AND CLASS.	Number of vessels.	TONNAGE. Gross.	TONNAGE. Net	Horsepower of engines.	Value of vessels.
Total	2,990	2,392,863	1,905,176	982,555	$130,805,640
Iron	33	27,827	23,034	16,638	2,025,050
Steam	32	27,752	22,963	16,638	1,995,050
Sail	1	75	71	.....	30,000
Unrigged	.....	.....	.....	.....	.....
Schooner barges	.....	.....	.....	.....	.....
Steel	539	1,606,326	1,236,273	623,373	103,704,366
Steam	457	1,461,729	1,101,773	623,373	97,410,073
Sail	3	4,335	3,913	.....	221,300
Unrigged	48	33,287	31,030	.....	1,691,534
Schooner barges	31	106,975	99,557	.....	4,381,459
Wood	2,391	737,386	628,750	334,092	24,075,474
Steam	1,172	410,104	315,469	334,092	16,677,489
Sail	408	101,136	95,888	.....	1,607,757
Unrigged	725	173,119	167,308	.....	4,897,773
Schooner barges	86	53,027	50,085	.....	892,425
Composite	27	21,324	17,119	8,452	1,000,750
Steam	15	16,201	12,023	8,452	901,200
Sail	2	23	21	.....	2,300
Unrigged	10	5,100	5,075	.....	97,250
Schooner barges	.....	.....	.....	.....	.....

The increase in the measured tonnage and consequently in the carrying capacity of lake shipping and the vast improvement in the engines with which the steamers are equipped, have been no less remarkable than the progress made in other directions. The necessity for increased tonnage, the progress made in the application of steampower to navigation, and the successive improvements in metallurgical science, which have produced a better metal for shipbuilding purposes, acting and reacting upon each other, have resulted, on the lakes as in other maritime quarters, in the extraordinarily effective fleet of to-day.

Table 7 shows that the average tonnage of all vessels enumerated increased from 336 in 1889 to 800 in 1906. The average tonnage of steam vessels, according to Table 5, increased from 406 to 1,143; and that of sailing vessels from 192 to 500. A decrease is noted in the average tonnage of unrigged vessels, but how far this is caused by the confusion in regard to schooner barges and the manner of reporting them at the two censuses, it is impossible to say. As indicated by Table 7, steel ships increased in average tonnage from 1,887 to 2,980 and wooden vessels from 301 to 308. The small increase noted in this respect in iron vessels and the decrease for those of composite construction, have no other significance than that they serve to emphasize the gradual passing into disuse of these types of craft.

The extent of the increase in the tonnage of lake shipping can not be fully understood from a consideration of average figures, and only a study of individual cases will convey the whole significance of the progress that has been made. As a partial means to this end, Tables 10 and 11 are introduced, the first showing the number and total tonnage, in 1906, for the four kinds of vessels—steam, sail, unrigged, and schooner barges—divided into classes according to their gross tonnage, and the second, similar statistics for steam and sailing vessels from 1889 to 1906 as reported by the Commissioner of Navigation.

TABLE 10.—VESSELS GROUPED ACCORDING TO GROSS TONNAGE: 1906.

CLASS.	TOTAL.		STEAM.		SAIL.		UNRIGGED.		SCHOONER BARGES.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	2,990	2,392,863	1,676	1,915,786	414	105,569	783	211,506	117	160,002
5 to 49 tons	843	18,096	578	12,569	181	2,876	69	2,261	15	390
50 to 99 tons	420	28,899	213	15,319	28	2,140	168	10,711	11	729
100 to 199 tons	307	44,130	86	12,787	32	5,094	187	25,884	2	365
200 to 299 tons	199	49,117	49	11,792	44	11,011	101	25,103	5	1,211
300 to 399 tons	159	58,549	49	17,198	33	11,463	72	28,154	5	1,734
400 to 499 tons	148	66,770	28	12,757	30	13,497	81	36,319	9	4,197
500 to 999 tons	279	193,546	115	82,850	54	36,694	87	58,581	23	15,421
1,000 to 1,499 tons	108	133,872	81	99,962	6	7,482	15	18 921	6	7,507
1,500 to 1,999 tons	113	198,261	108	189,648	1	1,729	2	3,092	2	3,792
2,000 to 2,499 tons	118	264,346	104	233,297	1	2,339	1	2,480	12	26,230
2,500 to 2,999 tons	35	95,414	30	82,067	3	8,026	.....	.....	2	5,321
3,000 to 3,999 tons	80	286,453	60	218,937	1	3,218	.....	.....	19	64,298
4,000 to 4,999 tons	103	469,803	100	456,123	.....	.....	.....	.....	3	13,680
5,000 to 5,999 tons	29	158,894	26	143,767	.....	.....	.....	.....	3	15,127
6,000 to 6,999 tons	40	262,375	40	262,375	.....	.....	.....	.....	.....	.....
7,000 tons and over	9	64,338	9	64,338	.....	.....	.....	.....	.....	.....

There were no tables similar to Tables 10 and 11 presented in the report on water transportation on the Great Lakes for the census of 1889, although information can be gleaned from various sources, which reveals the immense increase that has been made and is constantly being made in the carrying capacity of vessels engaged in lake commerce.

The highest class shown in Table 10 is that which includes vessels of over 7,000 tons, and there are but 9 ships, all steel steamers, in that class. These vessels are engaged in the iron ore trade and range in gross tonnage, by measurement, from 7,053 to 7,438; their carrying capacity, however, is much greater. All of the vessels in the higher classes, from 3,000 tons to the highest, are constructed of steel, and there is but one wooden ship with a tonnage in excess of 2,500.

To illustrate the tremendous carrying capacity of the steamers that exceed 7,000 gross tons each, it may be stated that their combined gross tonnage is 64,338, and that according to the estimates of the best authorities on the subject, their combined capacity in iron ore amounts to 101,000 tons. These 9 vessels are expected to make, on the average, about 25 round trips each season, although some can make 30, and they are capable, therefore, if operated and loaded to the limit of their capacity, of transporting nearly 3,000,000 tons of ore from Duluth to ports on Lake Erie between the opening and the close of navigation.

It is not only in the transportation of iron ore that these large carriers are employed. Vessels of equal capacity are used in the grain trade and in carrying coal, and since 1906 vessels of even greater dimensions have been constructed and were in commission during the season of 1907. As an example, it is recorded that during December of the latter year a new steel steamer, the *LeGrand S. DeGraff*, carried 421,000 bushels of wheat from Superior to Buffalo, which was the largest cargo ever loaded on the lakes up to that time; its equivalent in net tons was 12,630. Moreover, it is authoritatively announced that steamers are now being constructed that will exceed that record, vessels that if loaded down to a draught of 19 feet of water can carry 14,000 tons of coal, and if loaded to their full capacity, drawing 24 feet of water, will be capable of carrying 19,000 tons. This latter amount of cargo, however, the depths of the channels will not permit.

TABLE 11.—STEAM AND SAIL VESSELS, INCLUDING SCHOONER BARGES, CLASSIFIED ACCORDING TO GROSS TONNAGE: 1889 TO 1906.[1, 2]

YEAR.	TOTAL.		5 TO 49 TONS.		50 TO 99 TONS.		100 TO 199 TONS.		200 TO 299 TONS.[3]		300 TO 399 TONS.[3]		400 TO 499 TONS.[3]		500 TO 999 TONS.		1,000 TO 2,499 TONS.		2,500 TO 4,999 TONS.		5,000 TONS AND OVER.[4]	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
STEAM.																						
1906	1,844	1,841,438	683	16,903	238	17,581	[5] 254	61,302	.....	.....	.....	.....	.....	.....	120	86,658	299	531,658	187	740,909	63	386,427
1905	1,820	1,647,793	659	16,845	247	18,164	[5] 262	62,703	.....	.....	.....	.....	.....	.....	120	87,364	318	561,709	182	717,563	32	183,445
1904	1,820	1,592,270	642	16,456	250	18,320	[5] 271	65,157	.....	.....	.....	.....	.....	.....	137	110,544	320	564,220	180	707,780	20	109,793
1903	1,796	1,467,992	635	16,410	248	18,201	[5] 280	67,701	.....	.....	.....	.....	.....	.....	127	92,622	337	591,469	153	595,295	16	86,294
1902	1,795	1,377,872	647	16,805	245	18,009	[5] 289	70,136	.....	.....	.....	.....	.....	.....	129	94,047	339	591,248	129	496,321	17	91,306
1901	1,778	1,243,500	648	16,683	239	17,519	[5] 306	74,340	.....	.....	.....	.....	.....	.....	129	94,670	347	607,347	94	353,784	15	79,157
1900	1,739	1,110,565	648	16,644	240	17,703	[5] 302	73,808	.....	.....	.....	.....	.....	.....	125	90,877	341	591,378	[6] 83	320,155	.....	.....
1899	1,732	1,014,561	662	16,956	232	17,012	[5] 312	75,680	.....	.....	.....	.....	.....	.....	127	92,695	332	573,432	[6] 67	238,786	.....	.....
1898	1,764	993,644	666	16,946	235	16,952	155	22,037	70	17,063	74	25,854	35	15,713	128	92,783	344	590,768	[6] 57	195,528	.....	.....
1897	1,775	977,235	675	17,497	236	17,000	159	22,637	71	17,412	71	24,708	37	16,499	127	92,116	346	588,275	[6] 53	181,091	.....	.....
1896	1,792	924,631	701	18,062	225	16,092	168	23,834	73	18,016	74	25,781	36	15,984	132	95,827	343	582,442	[6] 40	128,593	.....	.....
1895	1,755	857,735	696	17,930	215	15,544	167	23,967	76	18,772	70	24,329	37	16,400	134	97,532	334	566,522	[6] 26	76,739	.....	.....
1894	1,731	843,240	695	17,954	207	14,791	162	23,341	74	18,252	68	23,582	39	17,350	127	93,502	337	570,908	[6] 22	63,560	.....	.....
1893	1,731	828,702	700	17,883	206	14,694	156	22,683	77	19,059	72	24,924	41	19,017	142	132,285	318	525,779	[6] 19	52,378	.....	.....
1892	1,631	763,063	649	16,778	199	14,188	158	23,155	74	18,345	66	22,783	35	15,493	117	86,361	321	534,490	[6] 12	31,470	.....	.....
1891	1,592	736,752	624	16,137	198	14,169	159	23,057	77	19,231	62	21,222	33	14,618	118	86,892	310	512,788	[6] 11	28,638	.....	.....
1890	1,527	652,923	620	16,076	188	13,513	153	22,216	75	18,726	59	20,113	33	14,601	119	87,009	272	439,787	[6] 8	20,882	.....	.....
1889	1,455	575,307	612	15,805	180	12,851	137	20,017	77	19,104	56	18,998	32	14,144	123	93,496	233	367,862	[6] 5	13,030	.....	.....
SAIL.																						
1906	519	269,136	131	2,886	44	3,261	[5] 202	60,008	.....	.....	.....	.....	.....	.....	88	59,027	27	48,014	24	80,813	3	15,127
1905	583	301,115	143	3,133	47	3,491	[5] 230	67,579	.....	.....	.....	.....	.....	.....	102	69,444	33	56,420	24	80,882	4	20,166
1904	623	308,820	155	3,465	53	3,901	[5] 249	73,216	.....	.....	.....	.....	.....	.....	104	70,622	34	57,199	24	80,251	4	20,166
1903	676	315,195	178	3,843	58	4,259	[5] 272	79,222	.....	.....	.....	.....	.....	.....	109	74,564	31	52,890	24	80,251	4	20,166
1902	726	318,032	196	4,340	65	4,744	[5] 297	85,564	.....	.....	.....	.....	.....	.....	111	75,773	31	52,620	22	74,825	4	20,166
1901	784	332,289	207	4,651	78	5,731	[5] 327	92,616	.....	.....	.....	.....	.....	.....	112	76,736	34	57,564	22	74,825	4	20,166
1900	832	335,183	221	5,038	84	6,237	[5] 353	99,328	.....	.....	.....	.....	.....	.....	115	78,752	35	56,227	[6] 24	89,601	.....	.....
1899	874	318,175	239	5,416	92	6,801	[5] 374	104,145	.....	.....	.....	.....	.....	.....	114	77,748	35	53,885	[6] 20	70,180	.....	.....
1898	960	333,704	245	5,464	105	7,636	104	15,662	150	38,024	110	37,055	54	24,035	135	93,398	41	59,966	[6] 16	52,464	.....	.....
1897	993	334,104	254	5,926	111	8,096	111	16,725	149	37,827	118	39,848	55	24,518	140	96,748	41	58,670	[6] 14	45,746	.....	.....
1896	1,044	309,152	270	6,257	120	8,730	121	18,188	160	40,527	128	43,232	57	25,425	146	101,121	38	52,781	[6] 4	12,891	.....	.....
1895	1,100	300,642	294	6,817	122	8,844	132	19,955	169	42,839	140	47,192	59	26,265	149	102,740	35	45,990	.....	.....	.....	.....
1894	1,139	302,985	299	7,027	133	9,643	140	21,145	180	45,599	143	48,081	61	27,202	151	104,503	32	39,785	.....	.....	.....	.....
1893	1,205	317,789	312	7,304	136	9,817	150	22,655	206	52,045	148	49,759	63	28,068	159	110,070	31	38,071	.....	.....	.....	.....
1892	1,226	319,618	310	7,252	139	10,073	156	23,679	218	55,241	153	51,433	64	28,520	160	110,775	26	32,645	.....	.....	.....	.....
1891	1,243	325,131	301	7,031	141	10,248	164	24,948	225	57,091	160	53,609	65	28,956	162	111,874	25	31,374	.....	.....	.....	.....
1890	1,272	328,656	308	7,409	144	10,422	172	26,124	235	59,581	162	54,304	64	28,521	164	113,442	23	28,853	.....	.....	.....	.....
1889	1,285	325,083	313	7,538	143	10,330	176	26,724	245	62,129	166	55,635	65	28,972	156	107,036	21	26,719	.....	.....	.....	.....

[1] From the reports of the Commissioner of Navigation.
[2] Lake Champlain vessels included.
[3] Not reported separately after 1898.
[4] Not reported separately prior to 1901.
[5] 100 to 499 tons.
[6] 2,500 tons and over.

Value of shipping.—The value of active lake shipping in 1906, as shown by Table 1, was $130,805,640, and in 1889 it was $48,580,174, an increase of $82,225,466, or 169.3 per cent. The percentages of increase in the value of steam vessels and of sail and unrigged craft combined, for the same period, were 186.2 and 79.2, respectively. The value of steamers as reported for 1880 was $13,918,925, and the increase of over $100,000,000 from that amount to $116,983,812, the value reported for the same class of vessels in 1906, is in some respects a fairly accurate statistical measure of the advance made during that time in steam navigation on the lakes. As in regard to all statistics in which value is the standard of measurement and comparison, the changing character of that standard from time to time should be kept in mind in considering the statistics of capital. The value of the vessels alone was not the only item of capital reported in 1906; a value was reported also of $6,282,755 for the item "all other property," and of $285,900 for "leases." The total capital invested was therefore $137,374,295.

In Table 5 of this section the values of steam, sail, and unrigged vessels are presented separately for both censuses, and in Table 7 the values are given for iron, steel, wood, and composite vessels. The per cent that each class represents of the total value is shown in Table 12.

TABLE 12.—*Value of vessels—per cent of total, by class and character of construction: 1906 and 1889.*

CLASS AND CHARACTER OF CONSTRUCTION.	PER CENT OF TOTAL VALUE.	
	1906	1889
Steam	89.4	84.1
Sail	5.5	8.7
Unrigged	5.1	7.1
Iron	1.5	6.6
Steel	79.3	15.1
Wood	18.4	75.7
Composite	0.8	2.5

If any additional evidence were needed to prove the growing substitution of steampower for sails and of steel for other materials used in construction, it is amply supplied in Table 12. Especially notable is the large increase in the percentage of steel vessels in 1906 over 1889 and the corresponding decrease in wooden ships. The increase in the percentage of steam ves-

sels, while less striking, is full of significance when compared with the proportion the value of sailing vessels forms of the total, especially as it indicates the almost total disappearance of the latter type of craft from the lakes. The schooner barges compose a part of the 5.5 per cent that the value of sailing vessels forms of the total value, and the elimination of these reduces the proportion for 1906 to 1.4 per cent.

The average value per gross ton of steam vessels, according to the statistics, was $69 in 1889, and $61 in 1906, a slight reduction. There was a small increase in the average value per ton of sailing vessels, from $23 in 1889 to $27 in 1906. The corresponding values for steel and wooden vessels were for the former $97 in 1889 and $65 in 1906, and for the latter $46 in 1889 and $33 in 1906.

The numerical increase in vessels is insignificant. The tremendous growth in the capital invested in transportation on the Great Lakes is the result of the great increase in the carrying capacity of vessels; the increased use of steel in construction; the marked improvement that has been made in the engines, in power, and in general effectiveness; and the greater volume of steam tonnage.

SHIPBUILDING.

The shipbuilding establishments on the Great Lakes have at all times proved equal to the exacting demands made upon them for additional floating equipment adapted to the requirements of lake navigation, and on a fair basis of comparison with shipyards in other sections of the country are in many respects of vital importance to the growth of the American merchant marine.

Table 13 is a statement of the annual additions to lake shipping for a series of years, according to the statistics reported by the United States Commissioner of Navigation.

TABLE 13.—*Vessels built: 1880 to 1906.*[1]

YEAR.	Number of vessels.[2]	Gross tonnage.
1906	152	259,678
1905	79	90,708
1904	95	155,851
1903	107	135,104
1902	100	165,462
1901	109	161,744
1900	94	127,207
1899	108	78,732
1898	67	51,775
1897	84	111,978
1896	108	107,753
1895	82	35,128
1894	95	40,801
1893	158	97,305
1892	141	43,039
1891	162	107,393
1890	161	105,360
1889	179	102,052
1888	183	96,315
1887	117	52,454
1886	66	18,255
1885	95	24,509
1884	110	27,883
1883	134	24,552
1882	199	51,749
1881	175	65,128
1880	117	20,857

[1] Reports of the Commissioner of Navigation, 1884 and subsequent years, and "Commerce and Navigation of the United States," Treasury Department, for years preceding 1884.
[2] Exclusive of canal boats.

GOVERNMENT VESSELS.

While the vessels which are employed in the performance of various governmental functions for the Federal Government and for states and municipalities can not, strictly speaking, be considered as a factor in the system of water transportation, they should receive some consideration as forming a part of the shipping of the country. Table 14 is a summary of the statistics pertaining to craft owned by states and municipalities.

TABLE 14.—VESSELS OWNED AND OPERATED BY STATE AND CITY GOVERNMENTS: 1906.

	Number of vessels.	TONNAGE.		KIND OF CRAFT.		Horsepower of engines.	CONSTRUCTION.		Value of vessels.	EMPLOYEES.	
		Gross.	Net.	Steamer, screw.	Unrigged.		Steel.	Wood.		Number.	Wages.
Aggregate	38	9,605	8,077	20	18	10,750	10	28	$1,048,093	246	$246,379
Chicago	24	7,393	6,597	8	16	3,640	2	22	349,000	100	91,302
Fire boats	5	796	315	5	.....	2,700	1	4	254,000	52	51,680
All other	19	6,597	6,282	3	16	940	1	18	95,000	48	39,622
Buffalo, fire boats	3	431	252	3	.....	1,500	3	.....	170,000	42	40,248
Cleveland, fire boats	2	191	70	2	.....	850	1	1	79,000	22	24,331
Detroit, fire boats	2	408	237	2	.....	1,910	2	.....	190,793	24	22,798
Milwaukee	6	1,106	877	4	2	2,600	2	4	249,300	54	65,420
Fire boats	4	634	425	4	.....	2,600	2	2	248,500	52	64,420
All other	2	472	452	.....	2	.....	.....	2	800	2	1,000
State of Ohio	1	76	44	1	.....	250	.....	1	10,000	4	2,280

It should be stated that while the statistics in this table are presented separately here, they are also included in the general tables of this report.

The vessels reported by municipalities consist mainly of fire boats for the protection from fire of waterside and floating property, the other craft, which are largely scows and barges, being employed for miscellaneous work, such as dredging, pile driving, and the transportation of sand, stone, and other materials and supplies required in public works.

Chicago leads both in fire boats and in craft employed in public works. The craft reported for Buffalo, Cleveland, Detroit, and Milwaukee are all fire boats, except 2 scows in Milwaukee, which are used for the

removal of ashes and garbage. The vessel reported for the state of Ohio is operated under the fish and game commission for patrol purposes and for taking and distributing spawn.

The vessels operated by the several departments of the United States Government, which are not included in the tables in this report, number 89 craft of various kinds. Six vessels are in the naval service; these have a total displacement tonnage of 4,769, and a total horsepower amounting to 4,333. Five of these vessels are screw propellers and 1 is a side wheel steamer; 1 is constructed of iron, 2 of steel, and 3 of wood; 1 vessel is in the regular naval service of the United States and 5 are loaned to the states bordering upon the lakes and are used for naval militia purposes. The Treasury Department operated 6 vessels—1 in the customs service, a gasoline launch at Duluth, and 5 in the Revenue Cutter Service—with a total displacement tonnage of 1,671. One is an iron ship, 2 are steel, and 3 wooden, and all are screw propellers. The larger part of the Government vessels are in the service of the engineers of the War Department, and are engaged in the various improvements to the channels, harbors, etc., authorized by law. As far as reported there were in this service in 1906, 42 wooden, 13 steel, and 2 iron vessels. The details in regard to the tonnage and horsepower were not completely available for these vessels; in particular there was no uniformity in the tonnage reported, but it was given in gross, net, and displacement, and the total of the different kinds was 5,130 tons. These vessels comprised the varied types of craft used in construction work, such as tugs; hydraulic, dipper, and suction dredges; scows, catamarans, etc., as well as steamers and launches. The Bureau of Fisheries of the Department of Commerce and Labor has 1 wooden vessel of 20 gross tons stationed on Lake Erie. The Light-House Service employs 19 vessels as light-ships and tenders, 2 of which are built of iron, 6 of steel, and 11 of wood, while 11 are screw propellers equipped with engines of 5,000 horsepower, 4 are sail vessels, and 4 are scows; the combined gross tonnage of these vessels is 5,376.[1]

THE FISHERIES.

As stated in the note preceding Table 1, there were a large number of vessels engaged in the fishing industry on the Great Lakes. According to the annual report of the Bureau of Fisheries for 1904, there were in 1903, 194 vessels of 3,506 net tons, valued at $634,450, which were engaged in fishing, and 12 vessels of 340 net tons, valued at $56,000, employed in carrying equipment to the fishing grounds and in transporting the catch to market. In addition there were 3,170 boats and gasoline launches, with a reported value of $317,060. This fishing fleet should be taken into account in any comprehensive survey of lake shipping.

[1] Official Register of the United States, 1907, pages 706 to 731.

INCOME.

Table 15 shows the gross income of lake shipping during 1906. This represents the gross receipts reported for all active lake shipping in 1906, the amounts received for each particular kind of service being segregated.

TABLE 15.—*Gross income: 1906.*

	Income.
Total	$65,274,702
From freight	52,076,533
From passengers	4,866,904
From all other sources	8,331,265

The gross amount earned by lake shipping during 1906 was $65,274,702, while that reported at the census of 1889 was $35,463,852, an increase between the two censuses of 84.1 per cent. Of the total income reported in 1906, 79.8 per cent came from the carriage of freight, 7.5 per cent from passenger traffic, and 12.8 per cent from the remaining sources.

FREIGHT TRAFFIC.

The statistics of freight for the Great Lakes are derived entirely from the reports of the Bureau of Statistics of the Department of Commerce and Labor. At the commencement of the census it was found that many of the transportation companies objected to the preparation of duplicate or similar statements of their freight business for two different bureaus of the same Department, and it was recognized that the collection of such duplicate reports might embarrass or interfere with the success of the inquiry in that or other directions. An agreement was accordingly made between the two offices that the Census Bureau would abandon the collection of freight statistics and confine its efforts to the other items of statistical inquiry. The shipowners were informed to this effect by mail and by the special agents.

The statistics of freight movements on the Great Lakes are collected by the Bureau of Statistics by means of supplementary manifests of the cargo, which are filed by the masters of vessels with the collector of customs and by him are forwarded weekly and monthly to the Bureau of Statistics. The following is the form of this manifest:

Facsimile of Manifest.

SUPPLEMENTARY MANIFEST OF VESSEL *(name)* .....

ARRIVING at the Port of ....., *on the* .....*day of* ....., *190*

CLEARED from the Port of ....., *on the* .....*day of* ....., *190*

Sail, Steam, or Tow, ... (State which.); *Registered tonnage (net tons)* .....

Name of Master, ...

ARTICLES.	CARGO LOADED— AT ORIGINAL PORT. Port.	CARGO LOADED— AT ORIGINAL PORT. Quantities Received.	CARGO LOADED— AT INTERMEDIATE PORTS. Ports.	CARGO LOADED— AT INTERMEDIATE PORTS. Quantities Received.	CARGO DISCHARGED— AT INTERMEDIATE PORTS. Ports.	CARGO DISCHARGED— AT INTERMEDIATE PORTS. Quantities Discharged.	CARGO DISCHARGED— AT FINAL DESTINATION. Port.	CARGO DISCHARGED— AT FINAL DESTINATION. Quantities Discharged.	ARTICLES.
Coal, hard[1] ..... net tons.									Coal, hard.[1]
Coal, soft[2] ..... net tons.									Coal, soft.[2]
Coal (fuel)[3] ..... net tons.									
Flour ..... net tons.									Flour.
Wheat ..... bushels.									Wheat.
Corn ..... bushels.									Corn.
Oats ..... bushels.									Oats.
Barley ..... bushels.									Barley.
Rye ..... bushels.									Rye.
Flaxseed ..... bushels.									Flaxseed.
Iron ore ..... gross tons.									Iron ore.
Iron, pig ..... gross tons.									Iron, pig.
Iron, manftd ... gross tons.									Iron, manftd.
Salt ..... net tons.									Salt.
Copper ..... gross tons.									Copper.
Firewood ..... cords.									Firewood.
Logs ..... M feet.									Logs.
Lumber ..... M feet.									Lumber.
Unclassed freight. net tons.									Unclassed freight.

NOTE.—Net tons, 2,000 pounds; gross tons, 2,240 pounds. [1] Anthracite. [2] Bituminous. [3] For steamer's consumption.

11—1300

NOTE.—The purpose of this Supplementary Manifest is to enable Masters to present at the end of each trip a more accurate record of the trip than could be made at the port of clearance. It should be filled out and delivered to the Collector of the Port of Final Discharge of the cargo.

Department of Commerce and Labor

BUREAU OF STATISTICS

LAKE COMMERCE

SUPPLEMENTARY MANIFEST OF VESSEL

(NAME)

---

filed at office of Collector of Customs

at ....,

on the .... *day of*

...., *190*

INSTRUCTIONS.

This manifest is to be forwarded by the Collector to the Bureau of Statistics, Department of Commerce and Labor, Washington, D. C., at the end of each week and on the last day of each month.

TABLE 17.—DOMESTIC SHIPMENTS AND RECEIPTS OF FREIGHT AT PRINCIPAL PORTS, WITH PER CENT EACH PORT SHOWS OF TOTAL: 1906 AND 1889.

PORT.	TOTAL FREIGHT TONNAGE HANDLED AT PORT.		SHIPMENTS.				RECEIPTS.			
			Tons (net).		Per cent of total.		Tons (net).		Per cent of total.	
	1906	1889	1906	1889	1906	1889	1906	1889	1906	1889
Total	.....	.....	[1]75,609,649	25,266,974	100.0	100.0	73,178,213	25,936,132	100.0	100.0
Ashland, Wis	4,407,031	2,247,242	3,774,931	1,759,884	5.0	7.0	632,100	487,358	0.9	1.9
Ashtabula, Ohio	10,157,785	2,695,180	2,481,670	489,585	3.3	1.9	7,676,115	2,205,595	10.5	8.5
Buffalo, N. Y	14,345,007	6,730,137	4,201,316	2,683,993	5.6	10.6	10,143,691	4,046,144	13.9	15.6
Cheboygan, Mich	172,403	218,940	148,530	194,417	0.2	0.8	23,873	24,523	[2]	0.1
Chicago-South Chicago, Ill	10,357,038	7,984,038	2,510,632	2,914,065	3.3	11.5	7,846,406	5,069,973	10.7	19.5
Cleveland, Ohio	11,670,328	3,621,570	3,434,962	883,862	4.5	3.5	8,235,366	2,737,708	11.3	10.6
Conneaut, Ohio	6,972,996	[3]	888,854	[3]	1.2	.....	6,084,142	[3]	8.3	.....
Detroit, Mich	1,184,862	764,553	203,223	148,803	0.3	0.6	981,639	615,750	1.3	2.4
Duluth, Minn	16,786,937	1,114,048	14,632,066	430,886	19.4	1.7	2,154,871	683,162	2.9	2.6
Erie, Pa	3,906,739	1,271,988	1,070,415	498,958	1.4	2.0	2,836,324	773,030	3.9	3.0
Escanaba, Mich	6,937,210	3,626,390	6,412,483	3,430,832	8.5	13.6	524,727	195,558	0.7	0.8
Fairport, Ohio	2,506,903	998,459	295,439	59,438	0.4	0.2	2,211,464	939,021	3.0	3.6
Frankfort, Mich	831,161	[3]	441,823	[3]	0.6	.....	389,338	[3]	0.5	.....
Gladstone, Mich	546,531	287,590	224,825	155,234	0.3	0.6	321,706	132,356	0.4	0.5
Grand Haven, Mich	420,541	169,546	145,249	68,396	0.2	0.3	275,292	101,150	0.4	0.4
Green Bay, Wis	726,958	156,810	107,008	55,441	0.1	0.2	619,950	101,369	0.8	0.4
Hancock-Houghton, Mich.[4]	526,554	286,191	66,572	78,144	0.1	0.3	459,982	208,047	0.6	0.8
Huron, Ohio	1,659,690	70,180	783,273	56,486	1.0	0.2	876,417	13,694	1.2	0.1
Kewaunee, Wis	143,466	32,627	60,758	23,354	0.1	0.1	82,708	9,273	0.1	[2]
Lorain, Ohio	4,211,733	620,773	1,698,823	273,874	2.2	1.1	2,512,910	346,899	3.4	1.3
Ludington, Mich	1,663,718	627,627	956,593	351,398	1.3	1.4	707,125	276,229	1.0	1.1
Manistee, Mich	521,841	629,910	488,239	601,814	0.6	2.4	33,602	28,096	[2]	0.1
Manistique, Mich	499,350	144,011	332,562	140,321	0.4	0.6	166,788	3,690	0.2	[2]
Manitowoc, Wis	1,237,790	113,377	577,064	25,023	0.8	0.1	660,726	88,354	0.9	0.3
Marine City, Mich	81,054	61,001	35,362	15,426	[2]	0.1	45,692	45,575	0.1	0.2
Marquette, Mich	1,810,685	1,710,885	1,531,965	1,567,539	2.0	6.2	278,720	143,346	0.4	0.6
Menominee, Mich	200,924	272,529	97,099	265,103	0.1	1.0	103,825	7,426	0.1	[2]
Milwaukee, Wis	6,236,146	1,935,808	1,233,293	351,554	1.6	1.4	5,002,853	1,584,254	6.8	6.1
Muskegon, Mich	119,877	1,002,743	61,517	851,440	0.1	3.4	58,360	151,303	0.1	0.6
North Tonawanda, N. Y.[5]	1,079,146	1,046,895	23,968	.....	[2]	.....	1,055,178	1,046,895	1.4	4.0
Ogdensburg, N. Y	465,337	662,904	56,062	192,860	0.1	0.8	409,255	470,044	0.6	1.8
Oswego, N. Y	54,777	691,118	37,436	288,271	[2]	1.1	17,341	402,847	[2]	1.6
Port Huron, Mich	358,077	170,073	211,232	18,000	0.3	0.1	146,845	152,073	0.2	0.6
Racine, Wis	176,968	160,537	17,147	1,225	[2]	[2]	159,841	159,312	0.2	0.6
Sandusky, Ohio	954,290	602,403	824,813	297,374	1.1	1.2	129,477	305,029	0.2	1.2
Sault Ste. Marie, Mich	438,954	76,125	243,565	39,062	0.3	0.2	195,389	37,063	0.3	0.1
Sheboygan, Wis	525,018	124,387	15,089	8,392	[2]	[2]	509,929	115,995	0.7	0.4
Superior-West Superior, Wis	12,582,263	1,180,297	8,447,890	304,605	11.2	1.2	4,134,373	875,692	5.6	3.4
Toledo, Ohio	4,167,813	1,436,991	2,350,837	930,640	3.1	3.7	1,816,976	506,351	2.5	2.0
Two Harbors, Minn	9,316,743	936,541	9,018,987	936,541	11.9	3.7	297,756	.....	0.4	.....
Washburn, Wis	373,119	188,393	170,072	133,301	0.2	0.5	203,047	55,092	0.3	0.2
All other ports	7,452,079	4,532,289	5,295,985	3,741,433	7.0	14.8	2,156,094	790,856	2.9	3.0

[1] Includes 2,003,453 net tons of bunker coal. [2] Less than one-tenth of 1 per cent. [3] Not reported. [4] Includes Portage. [5] Includes Tonawanda.

The relative importance of the different ports from another standpoint is presented in Table 18, which gives for each port the total number and the total tonnage of all vessels arriving and clearing during 1906.

TABLE 18.—*Domestic arrivals and clearances of vessels on the Great Lakes, by ports: 1906, with totals for 1904 and 1905.*[1]

PORT.	TWELVE MONTHS ENDING DECEMBER, 1906.			
	Arrivals.		Clearances.	
	No.	*Net tons.*	*No.*	*Net tons.*
Alexandria Bay	45	12,470	49	7,028
Alpena	462	304,327	488	312,308
Ashland	3,753	1,876,781	3,812	2,019,209
Ashtabula	1,540	4,141,202	1,614	4,198,664
Benton Harbor	568	405,849	610	430,278
Buffalo	3,302	6,472,750	3,323	6,466,348
Charlevoix	151	136,032	156	139,544
Charlotte	174	108,865	143	110,543
Cheboygan	636	451,394	772	501,741
Chicago-South Chicago	6,846	7,621,979	6,434	7,400,305
Cleveland	4,150	6,445,385	3,732	6,046,818
Conneaut	1,049	3,261,775	1,216	3,505,481
Detour	362	256,257	353	315,853
Detroit	3,141	2,409,823	2,799	2,314,517
Duluth	3,486	8,677,778	3,654	8,904,499
Dunkirk	49	4,630	26	3,640
Erie	999	2,040,762	974	2,000,854
Escanaba	2,038	3,284,951	2,132	3,361,519
Fairport	511	1,222,921	512	1,202,194
Frankfort	1,007	794,253	1,038	824,110
Gladstone	455	379,051	431	325,793
Grand Haven	1,155	1,321,621	1,212	1,347,239
Grand Marais	168	65,571	207	82,311
Green Bay	889	372,089	792	341,157
Hancock-Houghton[2]	622	941,756	642	979,620
Harbor Beach	222	240,640	201	216,658
Holland	328	278,633	341	307,027
Huron	438	751,376	453	730,997
Kelleys Island	494	167,302	489	171,689
Kenosha	537	159,468	521	155,669
Kewaunee	425	363,032	401	354,679
Lake Linden	113	185,306	106	175,709
Lorain	854	1,794,024	726	1,802,292
Ludington	2,361	2,821,719	2,370	2,765,355
Mackinac	958	693,453	860	688,585
Manistee	1,242	650,527	1,208	622,105
Manistique	573	548,885	582	548,876
Manitowoc	1,632	1,773,619	1,647	1,756,517
Marine City	232	94,197	228	89,196
Marinette	353	112,499	333	113,216
Marquette	509	870,340	510	918,417
Menominee	755	253,387	628	240,964
Michigan City	274	228,888	242	210,573
Milwaukee	5,707	7,070,440	5,621	6,941,613
Muskegon	460	302,175	437	297,259
Niagara Falls	25	14,638	14	7,165
North Tonawanda	619	415,414	467	327,602
Ogdensburg	345	303,215	303	308,880
Oswego	115	41,837	84	33,632
Peshtigo	152	205,928	150	200,579
Port Huron	755	550,690	1,005	645,852
Presque Isle	247	618,350	367	789,104
Put-in-Bay	288	230,944	209	172,694
Racine	1,709	1,297,804	1,714	1,300,962
St. Clair	200	74,693	217	75,390
St. Ignace	411	284,729	544	292,447
St. Joseph	383	330,225	571	483,324
Sacketts Harbor	116	4,123	89	3,346
Sandusky	659	493,677	806	538,074
Sault Ste. Marie	474	503,712	681	648,256
Sheboygan	803	567,372	786	511,657
South Haven	326	291,030	346	305,457
Sturgeon Bay	629	194,269	766	226,295
Superior-West Superior	2,349	5,775,509	2,370	5,727,088
Toledo	1,749	2,121,624	1,680	2,181,426
Tonawanda	158	87,955	277	162,526
Two Harbors	1,442	4,350,984	1,449	4,373,670
Washburn	2,788	257,461	2,877	246,666
Waukegan	625	238,011	589	197,795
All other	7,437	2,903,818	7,885	2,885,105
Total, 1906	80,829	94,528,194	81,271	94,893,961
1905	79,370	87,810,640	79,908	87,978,397
1904	68,732	67,622,126	68,967	67,773,295

[1] Bureau of Statistics, Department of Commerce and Labor, Monthly Summary, Internal Commerce of the United States, December, 1906, page 568.
[2] Includes Portage.

Iron ore.—As indicated by Table 16, iron ore is the principal article of freight, representing, in 1906, 56.5 per cent of the total tonnage of all lake receipts, as against but 29.4 per cent in 1889.

TABLE 19.—*Movement of iron ore for the principal ports of the Great Lakes: 1906 and 1889.*

PORT.	RECEIPTS (NET TONS).		SHIPMENTS (NET TONS).	
	1906	1889	1906	1889
Total	41,318,928	7,626,073	41,297,209	7,677,107
Ashland			3,627,593	1,663,021
Ashtabula	7,534,108	2,199,109	3,192	
Buffalo	5,186,744	333,827	18,637	
Chicago-South Chicago	4,762,150	731,188		
Cleveland	7,461,495	1,951,564	370	26,644
Conneaut	6,061,615	(1)		(1)
Duluth		10,691	12,492,775	
Erie	2,348,985	418,426	63	
Escanaba			6,335,682	3,364,067
Fairport	2,052,538	928,616		
Huron	871,697	761	11,891	
Lorain	2,417,109	335,162		
Marquette			1,518,043	1,541,495
Milwaukee	305,443	124,312	10,285	
North Tonawanda[2]	320,034	17,166	448	
Presque Isle			1,586,656	
Sandusky	35,861	208,411		
Superior-West Superior			6,700,740	
Toledo	1,611,004	97,476		
Two Harbors			8,862,028	936,541
All other ports	350,145	269,364	128,806	145,339

[1] Not reported. [2] Includes Tonawanda.

There is a very large fleet engaged solely in freighting ore, and the proportion of the total tonnage of freight which this product forms does not greatly exceed the proportion which the ore fleet represents of the total vessel tonnage. With the exception of a small amount consumed at Duluth and small rail shipments (about 1,000,000 tons in 1906) to furnaces in Michigan and Wisconsin, practically the entire quantity of iron ore produced in the Lake Superior region is shipped over the lakes. It is therefore evident that the production of ore and the facilities for shipping it to ports on Lake Erie and Lake Michigan have kept pace with each other and must continue to do so. How far this parity between the ore mined and that shipped over the lakes may be affected by the establishment of blast furnaces near the mines, which has been contemplated by some of the more important producers, is a question for the future.

The principal shipping ports for iron ore are Duluth, Superior-West Superior, and Two Harbors, on Lake Superior, through which ports the product of the Mesabi and Vermilion ranges finds its outlet; Ashland and Marquette, also on Lake Superior, for the Gogebic and Marquette fields, respectively; and Escanaba, on Lake Michigan, which is the shipping point for Menominee ore. It is the fact of this enormous production of iron ore that gives to Lake Superior its leading position among the other lakes in respect to the shipment of freight tonnage.

On the other hand, the principal ports of receipt are Ashtabula, Cleveland, Conneaut, Fairport, Huron, Lorain, and Toledo, in Ohio; Buffalo, N. Y.; and Erie, Pa., all on Lake Erie; and the port of Chicago-South Chicago. Much of this ore is smelted at the point of receipt, but a very large proportion is transshipped to other blast furnace centers in Pennsylvania and Ohio.

The facilities for loading and unloading iron ore at lake ports are probably as highly specialized as those for handling freight of any kind, and they have a most important bearing upon the traffic. The docks and mechanical equipment for the work are of the most efficient character and are briefly described as follows:

These docks are so constructed that the cars from the mines are run out on them. The hoppers in the bottom of the cars are let down, and ore is discharged by gravity into pockets from the bottom of which iron chutes lead to the vessel lying alongside the dock. Through the hatches of the vessel the ore is chuted by gravity into the hold at as many points as there are hatches. In this way very little manual labor is necessary. A cargo of 9,277 tons of ore has been loaded into the steamer *E. J. Earling*, at Mesabi dock No. 4, at Duluth, in seventy minutes, or an average of 7,288 tons per hour. * * *

Practically the entire success of a dock for receiving ore from a vessel, like a dock for loading vessels, depends on the ability to unload quickly and cheaply, and place in cars the tonnage that is daily brought alongside the docks by the gigantic ore carriers so constructed as to permit the hoisting and dumping by the most modern appliances, both electric and otherwise, of the greatest number of tons per hour in order to accomplish the quickest possible release of the vessel and effect the maximum saving in the cost of operation.

The efficiency of the machinery for unloading is shown by the record of the *George W. Perkins*, 10,346 tons having been taken off in four hours and ten minutes, or at an average rate of 2,582 tons per hour. * * *

Just here we have the keynote of the transportation service on the lakes, which is to secure for each vessel the least possible delay at port of loading or of discharge and consequently the greatest number of round trips possible in a season. The average number of trips that a modern vessel is able to make from the head of Lake Superior to Lake Erie is usually estimated at 20 per season, although with good dispatch at terminals some boats may make 25, and even more. Every additional trip in a season reduces the average cost of transportation, and the entire carrying trade is ever pressing to reduce delay, whether at terminals or en route. To the genius displayed in devising plans to accomplish this result is due in no small degree the record the lakes have made in affording the cheapest transportation in the world.[1]

The extremely low rates charged for ore transportation also greatly stimulate the traffic. According to the reports of the Bureau of Statistics, the average contract rate per gross ton in 1906 from Ashland and other ports at the head of Lake Superior to Ohio ports was 75 cents. The charge for trimming and unloading, according to the same authority, was 20 cents per ton, which makes a total charge of 95 cents per gross ton for the delivery at destination. The distance from Duluth to Cleveland, for example, is 834 miles; the rate per ton per mile, therefore, was 1.14 mills.

[1] Walter Thayer, "Transportation on the Great Lakes," Annals of the American Academy.

TABLE 20.—*Movement of coal and coke for the principal ports of the Great Lakes: 1906 and 1889.*

PORT.	RECEIPTS (NET TONS).		SHIPMENTS (NET TONS).	
	1906	1889	1906	1889
Total	15,532,715	5,162,471	[1] 17,575,467	6,105,799
Ashland	521,195	201,241	2,202	.....
Ashtabula	.....	.....	2,477,885	489,585
Buffalo	1,112	.....	3,112,577	2,156,670
Charlotte	.....	.....	180,634	350,000
Chicago-South Chicago	938,151	1,329,364	120,578	.....
Cleveland	4,629	1,200	2,905,506	825,030
Conneaut	.....	[2]	846,948	[2]
Detour	147,292	.....	115,598	.....
Detroit	26,905	141,900	62,776	3,564
Dollar Bay	130,880	.....	.....	.....
Duluth	1,580,382	485,000	13,052	.....
Erie	.....	.....	926,099	410,403
Escanaba	512,672	194,199	8,649	.....
Fairhaven	.....	.....	2,635	119,317
Fairport	3,400	.....	276,328	59,438
Frankfort	125	[2]	228,813	[2]
Gladstone	224,773	122,000	60	.....
Green Bay	380,757	70,374	3,705	12
Hancock-Houghton [3]	398,373	144,261	333	25,075
Huron	.....	235	771,375	56,000
Lake Linden	354,484	.....	53	.....
Lorain	.....	.....	1,697,370	273,671
Ludington	20,893	4,583	513,948	.....
Manitowoc	444,190	75,000	5,894	.....
Marquette	273,443	126,421	175	.....
Milwaukee	3,659,491	907,743	13,986	.....
Ogdensburg	192,509	66,231	1,752	65,356
Oswego	681	.....	37,265	282,098
Sandusky	.....	1,561	749,084	275,385
Sault Ste. Marie [4]	168,082	24,938	32,156	1,000
Sheboygan	440,216	50,000	578	200
Superior-West Superior	3,749,737	720,000	4,668	.....
Toledo	23,957	93,369	2,325,259	650,000
Two Harbors	288,935	.....	1,859	.....
Washburn	166,519	51,614	867	.....
All other ports	878,872	351,237	134,800	62,995

[1] Includes 2,003,453 net tons of bunker coal.
[2] Not reported.
[3] Includes Portage.
[4] St. Marys Falls.

Coal.—Coal is next in importance to iron ore in tonnage, the combined shipments of hard and soft coal amounting in 1906 to 17,575,467 net tons, an increase since 1889 of 11,469,668 tons, or 187.8 per cent. The explanation of the excess of shipments of soft coal over receipts in 1906, that "the shipments include 2,003,453 net tons of fuel or bunker coal, for which there is no corresponding return under the head of receipts," should be repeated here. The quantities shown for the two censuses are not strictly comparable, as coke is included in 1889 and the figures for it can not be separated. Much of this coal forms the return cargo from New York, Pennsylvania, and Ohio ports of vessels engaged in carrying iron ore from Lake Superior.

The shipments of anthracite coal are nearly all from Buffalo, as that city is the western terminus of some of the principal so-called "hard coal roads." As the chief use of this is for domestic purposes it finds a market in the large centers of population like Chicago and Milwaukee. A large quantity is also received at Superior for rail shipment farther west.

As previously pointed out, nearly all soft coal shipments are from Ohio ports on Lake Erie, the principal

ones ranking in importance as follows in the order named: Cleveland, Ashtabula, Toledo, Lorain, Conneaut, Huron, and Sandusky. Ludington, Mich., also is an important shipper of soft coal. This city is the western terminus on Lake Michigan of the Pere Marquette railroad, which has at that place water connection with Chicago and Milwaukee. As that railroad traverses the state of Michigan and has its headquarters at Detroit, it forms an important link for the transportation of the coal of Pennsylvania and Ohio during the time from December to April, when the Detroit river, St. Marys Falls canal, and the straits of Mackinac are closed to navigation. The figures of the Bureau of Statistics show that much more than one-half of the total westward coal shipments from Ludington were during the winter season. The leading receiving ports for soft coal are Superior-West Superior, Milwaukee, and Duluth. Chicago receives nearly all of its bituminous coal by rail from the coal fields of Illinois and Indiana.

As coal is the only important commodity freighted westward in bulk, it is for a large number of vessels the only cargo available for return to Lake Michigan and Lake Superior ports, and as a consequence there is brisk competition for the business, for without it, these vessels would be obliged to return either light or empty. The rates, therefore, are lower for coal than for any other article, the average rate on hard coal during 1906, as reported by the Bureau of Statistics, being 46 cents a ton from Buffalo to Chicago and 35 cents a ton to Duluth. The rates on soft coal are equally moderate.

Lumber.—Lumber ranks next to coal in volume of shipments. This commodity shows a decrease of 32.4 per cent, which is explained by the rapid exhaustion of the forests of Michigan, Wisconsin, and Minnesota, and the consequent decay of the lumber milling industry in those states. The principal ports for the shipment of lumber in 1906, as shown in Table 25, are Duluth, Manitowoc, Manistee, Manistique, Two Harbors, Milwaukee, Ashland, and Cheboygan, in the order given; each reported shipments exceeding 50,000,000 feet. Naturally the populous centers where the rough lumber is manufactured for the market lead in receipts of this commodity, Chicago being first. The increasing needs of these centers for manufactured and unmanufactured lumber are, however, now being supplied by railroad shipments, the receipts by lake shipments having been for many years on the decline. It is extremely probable that the lumber traffic on the Great Lakes will continue to diminish in importance unless under changed legislative conditions the product of Canadian forests is permitted to enter the American market. Should such a change be brought about, a large proportion of that product would probably be carried by water.

TABLE 21.—*Movement of lumber for the principal ports of the Great Lakes: 1906 and 1889.*

PORT.	RECEIPTS (NET TONS).		SHIPMENTS (NET TONS).	
	1906	1889	1906	1889
Total	3,497,110	6,857,257	3,615,140	5,348,398
Alpena			88,468	373,204
Bay City	64,084	4,200	2,804	481,596
Buffalo	275,420	403,951	4,484	
Chicago-South Chicago	810,844	2,588,004	1,626	2,106
Cleveland	350,200	565,626	3,026	1,092
Detroit	182,186	314,995	1,270	10,261
Duluth	6,546		922,954	13,110
East Tawas		383	1,656	212,467
Ludington	281,540		66,018	258,520
Manistee	800		199,136	477,785
Manitowoc	19,498	8,126	231,224	5,625
Marinette	6,410	278	105,610	341,445
Menominee	2,482		50,562	265,103
Milwaukee	143,912	412,479	114,060	
Muskegon	23,366	119,530	28,212	846,615
North Tonawanda[1]	712,918	1,029,729	2,926	
Oscoda			33,072	489,962
Oswego	5,370	283,058	100	
Toledo	75,598	282,399	374	5,106
All other ports	535,876	844,499	1,757,558	1,564,399

[1] Includes Tonawanda.

Wheat.—With the exception of wheat and corn it is impossible to compare the receipts and shipments of the various cereals during 1906 with those for 1889, for the reason that barley, oats, and rye were not shown separately for the earlier period.

The principal features indicated in the statistics of the movement of wheat are the large increase of receipts at Buffalo, the decrease in the shipments from the port of Chicago, and the very large increase in the shipments from Duluth and Superior-West Superior, these two ports leading now in that respect.

TABLE 22.—*Movement of wheat for the principal ports of the Great Lakes: 1906 and 1889.*

PORT.	RECEIPTS (NET TONS).		SHIPMENTS (NET TONS).	
	1906	1889	1906	1889
Total	1,459,029	919,162	1,431,804	969,150
Buffalo	1,268,065	781,548		
Chicago-South Chicago	21,072		261,058	312,203
Detroit	30,395	1,819		80,757
Duluth			535,733	207,732
Erie	69,419	33,779		
Milwaukee	5,010		54,245	29,191
Superior-West Superior			538,197	191,623
Toledo	8,714		10,849	132,363
All other ports	56,334	102,016	31,722	15,281

Corn.—A notable decrease in the transportation of corn on the lakes is exhibited by Table 23, Buffalo and Chicago, which are respectively the principal ports of receipt and shipment, both showing large losses. In explanation of this decrease it may be stated that since 1898, when the lake movement of corn rose to the maximum, there has been an almost constant annual reduction in the amount shipped by way of the lakes, the share diverted to the railroads showing a steady growth. An additional explanation is sug-

gested in the increased consumption at or near the place of production in stock feeding and in the manufacture of corn products and distilled liquors. The large excess of shipments over receipts shown in the total for all cities in 1906 is caused by the fact that the east bound bonded corn shipments are very heavy. This freight enters Canada at points on Georgian bay, is transshipped to the railways, and again enters the United States at points in northern New York or Vermont, and is not included in the tables as freight received.

TABLE 23.—*Movement of corn for the principal ports of the Great Lakes: 1906 and 1889.*

PORT.	RECEIPTS (NET TONS).		SHIPMENTS (NET TONS).	
	1906	1889	1906	1889
Total	981,075	1,583,901	1,218,883	1,929,614
Buffalo	698,735	1,319,560		
Chicago-South Chicago			1,082,519	1,769,621
Detroit	12,359	4,242		27,536
Duluth			192	49,901
Erie	38,677	98,623		
Milwaukee	2,893		84,225	1,434
Ogdensburg	131,543	131,907		
Superior-West Superior			33,982	5,211
Toledo				73,952
All other ports	96,868	29,569	17,965	1,959

Freight, by lakes.—The tables previously presented have indicated in part the relative positions of the several lakes in regard to the freight received and shipped on each, but this phase of lake transportation is brought out more clearly in Table 24.

This table was prepared from the table of the Bureau of Statistics which gives the freight figures for all lake ports. It should be explained that there were some lake ports of minor importance which could not be definitely located on any of the lakes either by the Bureau of Statistics or at the office of the Chief of Engineers of the War Department, to whom the matter was referred. These places were unimportant, their total receipts of freight amounting to only 27,126 tons and the shipments to 12,925 tons, or less than one-twenty-fifth and one-fiftieth of 1 per cent, respectively, of the totals for all lakes, and as it was generally believed by those well informed concerning lake navigation that most of these ports were lumber camps on Lake Superior, the statistics accordingly were credited to that body of water.

It should be stated, too, that ports on the Detroit river were considered as located on Lake St. Clair and those on St. Marys river as on Lake Superior.

If the total volume of both receipts and shipments is taken into account, Lake Erie occupied the most important position in lake traffic in 1906 as it did in 1889. Lake Superior was second in this respect in 1906, but was first in the quantity of freight originating on its shores. The most striking fact shown is the great gain made by Lake Superior in the actual and relative importance of the tonnage of its shipments, from about one-fifth in 1889 to more than one-half of the whole in 1906. The decrease shown in the tonnage of Lakes Huron and St. Clair and of Lake Ontario and the St. Lawrence river is almost equally noteworthy. The statistics for Lakes Huron and St. Clair should not be accepted as indicating a small amount of traffic on those lakes, for it is obvious, of course, that all vessels making the trip between the upper and lower lakes must traverse those waters. The amount of this traffic is fairly indicated elsewhere in this report where the operations on the Detroit river are shown.

TABLE 24.—SHIPMENTS AND RECEIPTS OF FREIGHT ON EACH OF THE GREAT LAKES, WITH PER CENT EACH IS OF TOTAL: 1906 AND 1889.

LAKE.	SHIPMENTS.				RECEIPTS.			
	Tons (net).		Per cent of total.		Tons (net).		Per cent of total.	
	1906	1889	1906	1889	1906	1889	1906	1889
Total	[1] 75,609,649	25,266,974	100.0	100.0	73,178,213	25,936,132	100.0	100.0
Superior	40,332,392	5,434,781	53.3	21.5	9,042,572	2,491,149	12.4	9.6
Huron and St. Clair	1,460,276	2,344,451	1.9	9.3	1,699,032	1,029,356	2.3	4.0
Michigan	15,073,679	10,090,366	19.9	39.9	18,359,780	8,480,892	25.1	32.7
Erie	18,455,131	6,386,392	24.4	25.3	43,633,816	12,957,483	59.6	50.0
Lake Ontario and St. Lawrence river	288,171	1,010,984	0.4	4.0	443,013	977,252	0.6	3.8

[1] Includes 2,003,453 net tons of bunker coal.

The supremacy of Lake Superior in the amount of freight shipped is to be attributed mainly to its iron ore and in less degree to its grain. Iron ore and grain swell the receipts of Lake Erie, while coal is the principal commodity shipped, with unclassified freight next in importance. Lake Michigan's large volume of freight shipments is made up principally of corn and other grains, flour, and unclassified freight from Chicago and Milwaukee and iron ore from Escanaba, and its receipts of iron ore, coal, and unclassified freight at Chicago and Milwaukee.

With the future development of the lake region and the growth of the cities on its shores the freight traffic on all the lakes except Ontario must continue to increase. There seems no probability of any increase in American commerce on Lake Ontario until a canal of reasonable depth connecting it with Lake Erie, within the United States, shall be constructed. It is

evident that the Welland canal does not fully serve the purpose of increasing to any extent the passage of American freight between the two lakes, as the tonnage so carried during the year ending June 30, 1904, amounted only to 252,481 tons.[1] These figures show a decrease over the preceding year, and as a matter of fact are smaller than those for every year previous as far back as 1882. The following quotation in regard to the commerce of Lake Ontario at the beginning of the last century affords a very vivid contrast between comparative conditions then and now:

> The commerce of Lake Ontario increased so fast that in 1800 it exceeded that of all the other lakes together.[2]

It has now less than one-half of 1 per cent of the combined commerce of the other lakes, if we consider only the ships of the United States.

There is another feature in connection with the statistics of freight that should receive mention here. When the figures were tabulated, for the purpose of verification they were carefully compared with those contained in other reports which presented corresponding data, such as the annual reports of chambers of commerce and other local trade bodies. This disclosed many discrepancies, some very large, between the statistics collected by the Government and those published by the boards of trade. Buffalo, Cleveland, Chicago, and Milwaukee were the principal cities for which these discrepancies were noted.

The matter was brought to the attention of the Bureau of Statistics, and in reply it was stated that the question had previously been the subject of repeated investigations, and that the discrepancies resulted from differences in the methods of compiling the figures and the different sources from which they were obtained. In addition a representative of the Bureau of the Census, while collecting general information concerning lake transportation, made inquiry into this question, calling for that purpose upon the secretaries of the commercial bodies and the collectors of customs in the principal cities, and was convinced as a result of his investigations that the discrepancies were not remarkable under the circumstances.

It is required of the master of a vessel engaged in commerce on the lakes that before the departure of his vessel from port he shall present at the custom-house duplicate manifests of his cargo, such manifests being subscribed and sworn to by him before the collector, who indorses thereon his certificate of clearance, retaining one copy for the files of his office and delivering the other for the use of the master, who afterwards files it at the custom-house of the port of destination. These manifests are sometimes presented and clearance obtained before the loading of the cargo, and it frequently occurs that the actual quantity of cargo and the quantity declared at the custom-house are different. Indeed, cases have been known where the cargo loaded was altogether different in character from the cargo declared at the custom-house. If in such cases the local trade body accepts the figures filed for its records of shipments, as is usually done, those records will not be a correct account of the traffic of the port.

After a vessel is loaded and leaves port it is customary for the owners to mail to the master at the port of destination a bill of lading which is a correct account of the contents of the cargo. This paper usually reaches its destination before the vessel, and the master, upon his arrival, if the bill of lading differs from the manifest, is enabled to correct the latter before filing it at the custom-house. This is not always done, however; sometimes by reason of delay in the mails the bill of lading is not received, and again masters, through indifference or carelessness, frequently fail to make the necessary corrections on the manifest.

Another cause of difference between the statistics of the Government and those of other organizations is found in the fact that the latter sometimes obtain their information, not from the custom-houses but from the shippers or consignees direct. This is done in Buffalo, where the receipts of grain are compiled by the chamber of commerce from reports of the elevator companies, which explains the large discrepancies in these statistics.

Discrepancies in the statistics of grain receipts for Cleveland, which are very large, are explained in the same manner as are those for Buffalo.

Although the Chicago board of trade is supplied with shippers' memoranda of cargoes taken out, the statistics in its annual report were compiled in 1906 from the clearance manifests, both for shipments and receipts, which accounts for the wide difference between the statistics of that body and those printed in this report for certain commodities. Recently, however, changes in methods have been adopted, which it is believed will tend to greater uniformity.

Conditions in Milwaukee are somewhat different from those found in the other large cities on the lakes, in respect to these statistics. Milwaukee being what is termed an "intermediate port" between Chicago and Lake Erie ports, masters of vessels are not required by law to take out clearance papers in addition to the ones granted to them at the original port of departure, and the secretary of the chamber of commerce was unable, formerly, to compile statistics of port receipts and shipments. Congressional action was therefore sought with a view to requiring a report to the collector of customs of all cargoes landed at or shipped from that port. The Lake Carriers' Association, representing a very large proportion of the tonnage, being opposed, it is stated, to such legislation, agreed on the part of its members, as a compromise,

[1] Annual Report, Department of Railways and Canals, Dominion of Canada, page LXII.

[2] One Hundred Years of American Commerce, vol. 1, page 26.

to supply the chamber of commerce with complete statements of freight loaded and unloaded, and from such statements the annual statistical report is now compiled. The figures in that report for certain commodities, especially flour, differed to a considerable extent from those published by the Bureau of Statistics. In order to ascertain the cause of those differences, a comparison was made of some of the supplementary manifests containing figures for cargoes of flour with the corresponding returns made to the chamber of commerce, and it was ascertained that in many cases, according to the manifests, the cargoes consisted of flour exclusively, while the returns made to the chamber of commerce indicated that in addition to flour a considerable proportion of the cargoes was feed. It is hardly reasonable to suppose that feed would have been reported if it had not formed part of the cargo, while it can very readily be seen that through indifference or carelessness it might be omitted from the manifest at destination, notwithstanding the regulations requiring a corrected report.

The questionable accuracy of these statistics has been before adverted to, and the following extract describing conditions which formerly surrounded the collection of the data, and which have not yet been completely corrected, is pertinent at this point:

> First of all, the laws governing the filing of manifests are not what they should be. * * * Under existing laws vessels carrying goods from a port in one collection district to another port in the same district are not required to report or clear at the custom-houses, and there is, therefore, no record in the custom-houses of the commodities so carried. But as the local business on the lakes is very small, this does not seriously impair the accuracy of the records. Second, there are a number of small ports on the lakes where there are no custom-houses, but at which a large lake business is done. Third, under the regulations that now obtain, a ship may clear from a port on the lakes for another port, and may stop at one or more intermediate ports, where she may receive and discharge cargo without reporting at the custom-houses of the intermediate ports. * * *
>
> Inaccuracies are due to the following causes: (1) Masters are permitted, under certain circumstances, to clear at the same time they enter—this custom is productive of error because masters may not, for a variety of reasons, take aboard what they supposed they would when they cleared; (2) masters do not often know what they have on board when they clear, even after their vessels are loaded—in some cases the statements on the basis of which freight is collected are made up after the ship has left port, and forwarded to the captain by mail or telegraph, and in numerous instances captains never know what they have on board, as they are simply directed to go to a certain place and load (the manager of the dock being informed how much to put on), and then ordered to depart for a certain port, where the manager of the dock assumes all responsibility for records: (3) in the case of miscellaneous cargoes, it would be necessary to delay the departure of the boats in some cases in order to give a correct statement of the cargoes, so the manifests are likely to be the captains' estimates of what they have on board; and (4) some errors are due to indifference—in the minds of some captains the filing of a manifest is a mere form, for statistics, in their opinion, have no value.
>
> Any attempt to remedy these evils should take cognizance of the fact that vast sums of money have been expended in terminal facilities, in order to secure dispatch in loading and unloading, and therefore regulations that would detain vessels would undo that which has been gained at an enormous expenditure of money and energy. If captains are forced to file correct statements of cargoes, vessels would in many cases be detained for some hours, and captains put to great inconvenience and to considerable expense. The docks are usually scattered over an enormous extent of territory. If a vessel finishes loading at 1 o'clock at night, the captain may be forced to walk several miles to the custom-house, as the street cars have probably stopped running, or secure a carriage at no little inconvenience and expense. Perhaps accurate statistics could be obtained and greater dispatch given to vessels by making the shippers instead of the captains responsible for reports. * * *
>
> The methods of collecting these statistics ought to be radically changed, if for no other reason, simply because the Government can not afford to permit its work to be held up to scorn. Lake shippers ought gladly to cooperate with the Government, for an accurate knowledge of the situation is absolutely necessary in order to enable Congress to make a wise appropriation of money to facilitate commerce on these waters. Without a positive basis of facts it is impossible to plan a judicious scheme of improvements. Any change in the regulations governing the collection of statistics which will delay traffic may be expected, in the future as in the past, to meet the opposition of the lake carriers. If the shipper instead of the carrier were called upon for a statement, there need be no delay.[1]

It is doubtful if the last recommendation, that the shipper instead of the carrier should be called upon for a statement, would in all cases be practicable. The method would be perfectly feasible if the cargo were owned by a single or a few shippers, but if the shipments were by numerous owners and were of a miscellaneous character, it might prove to be less effective than the present practice. It would seem, therefore, that the key to accurate and complete statistics is in customs regulations effectively and uniformly enforced.

[1] George G. Tunell, Statistics of Lake Commerce, 1898, pages 19 to 21.

TABLE 25.—DOMESTIC RECEIPTS AND SHIPMENTS AT PRINCIPAL PORTS, OF PRINCIPAL COMMODITIES: 1906.

PORT.	TOTAL (TONS, NET).		IRON ORE (TONS, GROSS).		IRON, PIG (TONS, GROSS).		IRON MANUFACTURES (TONS, GROSS).		COAL, HARD (TONS, NET).	
	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.
Total	73,178,213	175,609,649	36,891,900	36,872,508	387,659	369,741	544,726	554,074	2,980,606	3,087,227
Ashland	632,100	3,774,931	.....	3,238,922	.....	19,433	30	5	29,439	.....
Ashtabula	7,676,115	2,481,070	6,726,882	2,850	77,414	.....	.....	.....	.....	.....
Buffalo	10,143,691	4,201,316	4,631,021	16,040	72,460	3,234	13,103	156,420	1,112	2,699,666
Cheboygan	23,873	148,530	.....	.....	.....	.....	.....	.....	800	.....
Chicago-South Chicago	7,846,406	2,510,632	4,251,920	.....	30,556	155	19,759	6,952	810,988	3
Cleveland	8,235,366	3,434,962	6,662,049	330	10,981	3,005	788	277,575	.....	16,962
Conneaut	6,084,142	888,854	5,412,156	.....	5,958	.....	19	36,560	.....	17,600
Detroit	981,639	203,223	158,036	1,400	3,365	.....	72,191	5,049	2,200	.....
Duluth	2,154,871	14,632,066	.....	11,154,263	940	53,333	135,326	508	148,969	.....
Erie	2,836,324	1,070,415	2,097,308	56	31,106	81	.....	8,880	.....	257,340
Escanaba	524,727	6,412,483	.....	5,656,859	12	38,064	452	967	25,412	.....
Fairport	2,211,464	295,439	1,832,623	.....	22,250	7,729	.....	125	1,900	.....
Frankfort	389,338	441,823	26,101	.....	31,356	28,267	806	20,457	.....	2,535
Gladstone	321,706	224,825	.....	12,198	.....	17,750	29,941	117	7,130	.....
Grand Haven	275,292	145,249	.....	.....	212	161.	150	.....	.....	3,797
Green Bay	619,950	107,008	.....	2,550	50	.....	868	1	88,568	26
Hancock-Houghton[2]	459,982	66,572	.....	.....	.....	.....	7,872	.....	36,619	.....
Huron	876,417	783,273	778,301	10,617	.....	.....	60	.....	.....	.....
Kewaunee	82,708	60,758	.....	.....	252	.....	4,857	.....	2,532	.....
Lorain	2,512,910	1,698,823	2,158,133	.....	26,935	.....	.....	30	.....	.....
Ludington	707,125	956,593	1,447	494	2,482	14,755	4,078	23,817	1,550	26,153
Manistee	33,602	488,239	.....	.....	.....	.....	.....	.....	1,000	.....
Manistique	166,788	332,562	.....	3,862	23,347	56,537	19,397	1,284	1,913	.....
Manitowoc	660,726	577,064	.....	885	9,309	426	13,739	770	26,244	.....
Marine City	45,692	35,362	.....	.....	.....	.....	.....	50	952	.....
Marquette	278,720	1,531,965	.....	1,355,396	.....	8,606	850	.....	17,287	.....
Menominee	103,825	97,099	.....	22,493	40	.....	1,537	298	2,621	.....
Milwaukee	5,002,853	1,233,293	272,717	9,183	14,688	521	26,354	3,381	722,156	1,638
Muskegon	58,360	61,517	.....	.....	.....	420	.....	.....	1,835	.....
North Tonawanda[3]	1,055,178	23,968	285,745	400	6,200	75	984	3,495	.....	3,530
Ogdensburg	409,255	56,062	.....	.....	.....	.....	35	60	11,003	.....
Oswego	17,341	37,436	.....	.....	.....	.....	.....	.....	681	35,519
Port Huron	146,845	211,232	.....	1,000	.....	.....	81	250	8,506	.....
Racine	159,841	17,147	.....	.....	.....	.....	.....	.....	33,214	.....
Sandusky	129,477	824,813	32,019	.....	1,835	.....	.....	.....	.....	4,000
Sault Ste. Marie	195,389	243,565	8,500	4,400	.....	.....	548	.....	24,627	.....
Sheboygan	509,929	15,089	.....	.....	.....	.....	21	.....	133,569	.....
Superior-West Superior	4,134,373	8,447,890	.....	5,982,804	.....	58,695	118,471	.....	671,554	.....
Toledo	1,816,976	2,350,837	1,438,396	.....	1,117	.....	250	280	23,937	11,012
Two Harbors	297,756	9,018,987	.....	7,912,525	.....	32,564	7,857	.....	.....	.....
Washburn	203,047	170,072	3,344	.....	.....	.....	.....	.....	4,371	.....
All other	2,156,094	5,295,985	115,202	1,482,381	14,794	25,930	64,302	6,743	137,917	7,446

[1] Includes 2,003,453 net tons of bunker coal. [2] Includes Portage. [3] Includes Tonawanda.

TABLE 25.—DOMESTIC RECEIPTS AND SHIPMENTS AT PRINCIPAL PORTS, OF PRINCIPAL COMMODITIES: 1906—Continued.

PORT.	COAL, SOFT (TONS, NET).		SALT (TONS, NET).		COPPER (TONS, GROSS).		LOGS (M FEET).		LUMBER (M FEET).		FLOUR (TONS, NET).	
	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.
Total	12,552,109	[1]14,488,240	554,811	567,986	125,435	116,564	70,970	75,605	1,748,555	1,807,570	1,338,189	1,334,979
Ashland	491,756	2,202	200				16,076	1,200	124	56,889		
Ashtabula		2,477,885					225		483			
Buffalo		412,911	632	53,818	76,975				137,710	2,242	936,260	
Cheboygan	9,874	571					1,200	1,507		50,717		30
Chicago-South Chicago	127,163	120,575	204,939	2,629	4,108	25	2,400	350	405,422	813	419	297,687
Cleveland	4,629	2,888,544	548	223	565		132		175,100	1,513	1,413	1,009
Conneaut		829,348							93		17	
Detroit	24,705	62,776	9,678	1,250	6,519				91,093	635	2,070	5
Duluth	1,431,413	13,052	43,922		8,402	100	20,824	1,025	3,273	461,477		224,288
Erie		608,759			8,522	150			9,440		190,097	173
Escanaba	487,260	8,649	476					476	530	10,412		2
Fairport	1,500	276,328			4,789		300		31		64,309	
Frankfort	125	226,278	4	1,423	6,096		179		58,912	14,397	5,172	
Gladstone	217,643	60	5,243	147						5,264		90,770
Grand Haven		27,273	18	3,961	103	75	32		14,958	721	54,529	377
Green Bay	292,189	3,679	8,343	183					318	9,556	9	10
Hancock-Houghton[2]	361,754	333	297			50,107		275		3,415	855	
Huron		771,375							855			
Kewaunee	52,817	1,048	361			25			346	2,843		1,993
Lorain		1,697,370							6,301			
Ludington	19,343	487,795	30	127,220	2,422		438	120	140,770	33,009	54,841	119
Manistee		16,326	209	244,319				267	430	99,568	912	
Manistique	65,577	5,314	451			125		46	761	91,413		5,160
Manitowoc	417,946	5,894	8,955			6,051		35	9,749	115,612	60	38,484
Marine City	41,796	2,785		30,751					691	337		
Marquette	256,156	175	95							2,021		
Menominee	40,330	30	4,713	23				128	1,241	25,281		
Milwaukee	2,937,335	12,348	139,076	33	275	2,379	1,085	104	71,956	57,030	429	313,424
Muskegon		8,903							11,683	14,106	85	50
North Tonawanda[3]		11,585					900		356,459	1,463		
Ogdensburg	181,566	1,752							13,367	158	14,665	
Oswego		1,746							2,685	50		
Port Huron	74,355	5,102	515	36,749					2,627	600	8,120	
Racine	57,688	15							4,509			
Sandusky		745,084	3,896	50					27,454			
Sault Ste. Marie	143,455	32,156	212					7,000	850	10,166	90	
Sheboygan	306,647	578	25,326				87		8,523	440		25
Superior-West Superior	3,078,183	4,668	20,560		299	17,191	290		952	45,405	867	359,403
Toledo	20	2,314,247	28,423						37,799	187		
Two Harbors	288,935	1,859							5	57,540		
Washburn	162,148	867					4,600	400	430	38,517		72
All other	977,801	339,995	47,689	65,207	6,360	40,336	22,202	62,672	150,625	593,773	2,970	1,898

[1] Includes 2,003,453 net tons of bunker coal.

[2] Includes Portage.

[3] Includes Tonawanda.

TABLE 25.—DOMESTIC RECEIPTS AND SHIPMENTS AT PRINCIPAL PORTS, OF PRINCIPAL COMMODITIES: 1906—Continued.

PORT.	WHEAT (BUSHELS).		CORN (BUSHELS).		OATS (BUSHELS).		BARLEY (BUSHELS).		RYE (BUSHELS).		UNCLASSED FREIGHT (TONS, NET).	
	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.
Total	48,634,291	47,726,778	35,038,398	43,531,540	32,436,489	33,638,055	18,496,834	18,252,250	2,159,308	2,227,813	5,933,380	5,986,290
Ashland				3,278							30,043	3,495
Ashtabula											53,212	593
Buffalo	42,269,484		24,954,822		24,105,071		14,131,440		1,161,201		837,312	832,988
Cheboygan			20		30	3,600					7,198	38,902
Chicago-South Chicago	702,415	8,701,930		38,661,377		6,316,307		726,795	20,000	476,786	1,035,317	602,943
Cleveland	678,000	161,000	157,805		385,000	2,000	158,200				367,891	205,716
Conneaut	1,002		1,058		8,455						15,435	959
Detroit	1,013,168		441,400		6,148		340,000				440,864	130,699
Duluth		17,857,752		6,860		4,264,448	62,000	29,606		292,000	256,385	300,416
Erie	2,313,952		1,381,310				11,500				125,606	133,875
Escanaba											10,000	1,231
Fairport			608,250						293,389		34,125	10,315
Frankfort	20,100		5,155		1,270,535		1,304,570		245,250		133,983	128,222
Gladstone		583,271		123,000		2,196,764		620,994		200,700	58,156	13,033
Grand Haven	21,704		629,809		1,429,729		679,873		47,703		131,334	108,135
Green Bay	1,050					2,580,530	208	1,003,433	8,142	182,000	228,912	10,675
Hancock-Houghton [1]	3,500		3,860		36,255						50,848	1,914
Huron											2,943	7
Kewaunee		1,675		9,400		127,600	9,000	591,317		229,956	20,368	29,017
Lorain											53,032	1,419
Ludington	79,340	2,205	1,006,652	1,765	3,876,983	1,920	1,385,159	6,100	364,655	13,500	199,898	204,264
Manistee			18,255		89,900						28,672	27,123
Manistique		24,098		25,360		89,775	1,000	5,960		8,565	49,427	66,556
Manitowoc		20,100		53,144		4,809,338	11,100	1,973,573	15,500	303,999	161,509	157,262
Marine City											1,562	1,096
Marquette											4,230	66
Menominee							76				51,911	20,318
Milwaukee	107,000	1,808,180	103,311	3,008,050		3,664,468	5,000	4,178,990		317,985	604,780	467,650
Muskegon	15,546		30,048		29,915		5,680				31,152	23,882
North Tonawanda [2]											9,080	1,481
Ogdensburg	476,741		4,697,950		815,502						16,355	53,947
Oswego	46,000						388,150				594	71
Port Huron			938,200		103,500						22,077	166,781
Racine											59,921	17,132
Sandusky	307,696				146,800						15,177	75,679
Sault Ste. Marie					2,200						15,136	151,149
Sheboygan				300		9,200					26,882	13,451
Superior-West Superior		17,939,902		1,213,630		6,744,656		8,931,323		143,540	226,832	308,812
Toledo	290,450	361,632									67,749	14,041
Two Harbors											11	3,548
Washburn		238,983		424,590		2,796,383		123,875		44,940	8,923	22,067
All other	27,143	26,050	60,433	786	130,466	31,066	3,878	60,284	3,468	13,842	347,938	1,635,340

[1] Includes Portage.

[2] Includes Tonawanda.

PASSENGER TRAFFIC.

One of the most important features at the different censuses of water transportation has been the obtaining of statistics as to the transportation of passengers, and the results for the Great Lakes are presented in the following table:

TABLE 26.—*Passengers carried: 1880 to 1906.*

	1906	1889	1880
Number of passenger carrying vessels	282	405	(1)
Passenger and freight vessels	236	365	(1)
Ferryboats	46	40	28
Income from passengers[2]	$4,865,736	(1)	(1)
Passenger and freight vessels	$4,408,880	(1)	(1)
Ferryboats	$456,856	(1)	(1)
Number of passengers carried[2]	14,079,121	2,235,993	1,356,010
On passenger and freight vessels	5,814,639	1,612,519	926,250
On ferryboats	8,264,482	623,474	429,760

[1] Not reported separately.
[2] Exclusive of $1,168 reported as income from 1,025 passengers carried on tugs and other towing vessels.

Although the census of 1880 was limited to steam vessels, the statistics included in this table are no less valuable for comparative purposes on that account, as practically no passengers are carried for hire in sailing or unrigged vessels. It will be noted that the income received from passenger traffic was not reported separately either in 1880 or 1889, so that no comparisons of such data can be made.

The increases in the number of passengers, both on ferryboats and on other vessels, between 1889 and 1906 are most striking, but it is probable that the statistics for 1889, especially those for ferry passengers, are very much understated. In the report for that census it is stated:

> The figures of passenger traffic are interesting so far as they go, but it must be confessed that the returns were not made with that scrupulous care which characterized the schedule reports of traffic and equipment.

As indicated by the table, the passengers were reported in two classes, those carried on ferryboats and those on other vessels engaged in the passenger business exclusively or in the passenger and freight business. It hardly seems necessary to state that ferry passengers are those transported between two neighboring points, usually a short distance apart, and that the others are those traveling longer distances between different localities and in a large measure are made up of summer excursionists on pleasure trips.

Attention is called to the fact that although the ferry passengers for 1906 constitute considerably more than one-half of the total number, the income received from that source is less than one-tenth of the total; or, stating it in another form, the average fare per ferry passenger was 5.5 cents and for those carried on passenger and passenger and freight vessels 75.8 cents, showing the longer distance traveled by the latter class and the superior accommodations furnished.

At the census of 1889 the number of "regular" and "excursion" passengers were reported separately and a similar inquiry was made a part of the schedule at the present census. There was some confusion shown as to the precise meaning of the term "excursion" passengers and the manner in which they should be reported, whether all passengers purchasing return tickets came under that head or only those taking ordinary day excursions, and whether they should be reported twice or only once. Because of this doubt the number of excursion passengers is not given in this report. It is probable that this classification of passengers was no less confusing at the census of 1889 and that the statistics were thereby more or less affected.

Vessels licensed to carry passengers are required by law to report periodically the number of passengers carried to the officers of the United States Steamboat Inspection Service, and the total number reported by that branch of the service for 1906 on the Great Lakes was 16,301,220, or 2,221,074 in excess of the Census figures.

TABLE 27.—*Passengers reported for each district of the United States Steamboat Inspection Service on the Great Lakes: 1906.*[1]

LOCAL INSPECTION DISTRICT.	Number of passengers.
Total	16,301,220
Buffalo	895,549
Chicago	1,818,194
Cleveland	805,340
Detroit	7,403,154
Duluth	1,051,074
Grand Haven	770,536
Marquette	478,515
Milwaukee	484,691
Oswego	480,014
Port Huron	549,097
Toledo	1,565,056

[1] Annual report of the Steamboat Inspector-General.

The discrepancy between the statistics of the two offices can not be fully accounted for. A representative of the Census Office spent several days in examining the methods employed by the Inspection Service in reporting the transportation of passengers and discovered considerable lack of uniformity, as between the several local inspection districts, in returning this information. Furthermore, in a letter received from the Supervising Inspector-General the statement was made that "it is a matter of discretion with the master of the steamer as to which board he may report," and "a steamer running between Buffalo and Cleveland, for instance, may report to Buffalo the whole number of passengers carried both ways, or she may report some at Buffalo and some at Cleveland." With such latitude allowed it would not be surprising if some masters failed occasionally to report, or if some reported twice, at the port of departure and the port of distribution, as there appears to be no system of checking these returns. It is but

fair to state in this connection that the general rule was to report only the passengers departing from the port, but the rule was not uniformly applied.

A comparison of the returns on file in several of the more important districts disclosed several instances of duplication, amounting in the aggregate to 600,000 passengers at least, which explains that degree of difference.

Canadian vessels made no reports to the Bureau of the Census, but in the statistics of the Steamboat Inspection Service the returns of at least 2 such vessels, reporting 181,192 passengers at Buffalo, were included.

Another instance of a difference in the methods of the two offices was in regard to vessels carrying passengers, but not for hire. Those passengers were not reported to the Census, but were included, to a large extent, in the reports of the Inspection Service. It was ascertained that this was the practice in nearly every district, and those passengers were in the aggregate very numerous. From Cleveland especially, during the summer season, large numbers of passengers, the officers or directors of the transportation companies or allied concerns and their friends, take free passage to resorts on Lake Superior on the iron ore freighters, which are in some cases luxuriously fitted up for a limited number of passengers. It was ascertained also that in one case men employed on a harbor lighter at Chicago were reported as passengers.

Accurate records of the number of passengers carried during the year were not always kept by the transportation companies, and in such cases the reports furnished to the Steamboat Inspection Service were perhaps more nearly correct than those made to the Bureau of the Census, as the reports to the former were made either at the end of each trip or at stated short periods, while the reports to the Census were made at the end of the year and were in many instances rough estimates.

A careful examination of all the returns received shows that the passengers carried on the lakes may be separated into three main groups in order of number—ferry passengers, summer day excursionists for recreation and pleasure, and passengers traveling between cities distant from each other, either on business or pleasure.

Fully three-fourths of the ferry passengers were reported from Detroit by the lines operating between Detroit and Windsor and Walkerville, Ontario, and between Detroit and Belle Isle park in the Detroit river. Ferries were also reported at Buffalo, Duluth, Superior, Port Huron, Milwaukee, and other points.

The day excursionists were naturally most numerous at the large centers of population, and this business in the summer time keeps a large number of vessels in commission.

There are many lines in the passenger business between the important cities on the lakes, and some are engaged in interlake traffic. Many of the vessels operated by these lines are splendid products of the shipbuilding art, being equipped with every convenience for the comfort and luxury of the passengers. During the season of navigation these vessels, which are frequently taxed to their utmost capacity, are active competitors of the railroads, and, giving lower rates where the route is direct, and affording greater comfort, have every advantage over them except those of speed and the frequency with which the trips may be taken.

EMPLOYEES AND WAGES.

Table 28 presents all the comparative data available in regard to employees and wages as reported at the censuses of 1889 and 1906.

TABLE 28.—*Employees and wages, by class, with per cent of increase: 1906 and 1889.*

CLASS.	Census.	Number of employees.	Wages.
Total	1906	24,916	$13,280,716
	1889	22,726	8,098,191
Per cent of increase		9.6	64.0
Steam	1906	20,515	11,179,882
	1889	15,271	5,796,895
Per cent of increase		34.3	92.8
Sail	1906	2,258	962,542
	1889	5,758	1,804,003
Per cent of increase		[1] 60.8	[1] 46.6
Unrigged	1906	2,143	1,138,292
	1889	1,697	497,293
Per cent of increase		26.3	128.9

[1] Decrease.

The above table includes both for 1889 and 1906 only those employed on vessels and the wages they received. The report on steam navigation, census of 1880, gives the number employed on steamers at that time as 9,143, who received $3,293,964 in wages.

The statistics for sailing vessels in Table 28 indicate even more clearly the decadence of that class of craft, which has already been noted in other tables, and this is still more strongly emphasized by deducting the figures for those employed on schooner barges, which leaves 1,490 employees, receiving $622,341 in wages.

The Census report on this subject for 1889 contains statistics of employees and wages in very great detail. The wages are reported for steam, sail, and unrigged vessels, by lakes and for the principal ports on each. The number of employees of the various grades from captains to deck hands, with their monthly wages, are given in the same manner. When it is considered that of the total number of craft reported at that census, 2,737, the employees and wages were reported only for 1,841 vessels and that the data were estimated for the remaining 896 vessels, "the estimate being based on the figures actually reported for 1,841 craft," the conclusion seems inevitable that not much dependence can be placed upon the accuracy of the figures. They may or may not closely approximate the facts.

The number of employees on vessels reported at the census of 1906 is the number ordinarily required for their operation, including officers of all grades, seamen, stewards, cooks, laborers, etc., or what is termed the "crew" or "ship's company," and very complete returns were received from practically all shipmasters and owners to whom the schedule was presented. The statistics for 1889 have practically the same meaning, the schedule having called for the "number making up ordinary crew of vessel."

Employees on the Great Lakes, both those on board vessels and those on shore, are strongly organized for mutual protection and advantage. The several organizations are the Lake Seamen's Union, the International Longshoremen's Marine and Transport Workers' Association, the Marine Cooks and Stewards' Union, the Marine Firemen, Oilers and Water-Tenders' Union, and the Marine Engineers' Beneficial Association. Annual agreements regulating wages and other conditions of employment are entered into between these organizations and the Lake Carriers' Association, with which nearly all the leading owners are associated. The officers of vessels are not organized for the regulation of salaries, but yearly contracts governing the scale are made with those below the grade of master. The salary of the master is a matter of individual arrangement between him and the owner who employs him, and is chiefly dependent upon the size and tonnage of the boat, and the value which the owner places on his services. Some owners pay considerably more than others on boats of the same size, particularly on the larger vessels. The salaries generally run from $1,000 for a 1,000-ton boat, $1,500 to $1,700 for a medium-sized boat, and $2,000 to $2,200 for boats of 10,000 tons carrying capacity. In some cases $2,500 is paid if the owner regards the master as a particularly efficient officer; this, however, is exceptional.

Below is printed a copy of the "card of wages" for 1906, which presents, in tabular form, the wage scale governing the compensation of all officers and men employed on board vessels, with the exception of masters.

Card of wages adopted by the Lake Carriers' Association for the year 1906.

STEEL STEAMERS.

FIRST CLASS.		Per month.
Chief engineers	Class A, (see note).	$175.00
First assistant engineers	Class A, (see note).	115.00
Second assistant engineers	Class A, (see note).	80.00
Chief engineers	Class B, (see note).	150.00
First assistant engineers	Class B, (see note).	100.00
Second assistant engineers	Class B, (see note).	75.00
First mates		115.00
Second mates		80.00
Cooks, vessels over 4,000 gross tons		80.00
Second cooks and waiters, to Oct. 1		30.00
Second cooks and waiters, Oct. 1 to close of navigation		37.50
Porters, to Oct. 1		25.00
Porters, Oct. 1 to close of navigation		35.00
Firemen, oilers, and water tenders, to Oct. 1		45.00
Firemen, oilers, and water tenders, Oct. 1 to close of navigation		65.00
Wheelsmen and lookouts, to Oct. 1		45.00
Wheelsmen and lookouts, Oct. 1 to close of navigation		65.00
Ordinary seamen, to Oct. 1		27.50
Ordinary seamen, Oct. 1 to close of navigation		37.50

Notes.

Class A.—Steel steamers of over 5,500 gross tons, Government register.

Class B.—Steel bulk freight steamers of 2,100 to 5,500 gross tons, Government register, and steel package freight steamers of over 3,000 gross tons, Government register.

Card of wages adopted by the Lake Carriers' Association for the year 1906—Continued.

STEEL STEAMERS—Continued.

SECOND CLASS.	Per month.
Chief engineers	$125.00
Assistant engineers	90.00
Chief engineers, steel package freight steamers, 1,800 to 3,000 gross tons	150.00
First assistant engineers, steel package freight steamers, 1,800 to 3,000 gross tons	100.00
First mates	100.00
Second mates	70.00
Cooks, vessels less than 4,000 gross tons	70.00
Second cooks and waiters, to Oct. 1	30.00
Second cooks and waiters, Oct. 1 to close of navigation	37.50
Porters, to Oct. 1	25.00
Porters, Oct. 1 to close of navigation	35.00
Firemen, oilers, and water tenders, to Oct. 1	45.00
Firemen, oilers, and water tenders, Oct. 1 to close of navigation	65.00
Wheelsmen and lookouts, to Oct. 1	45.00
Wheelsmen and lookouts, Oct. 1 to close of navigation	65.00
Ordinary seamen, to Oct. 1	27.50
Ordinary seamen, Oct. 1 to close of navigation	37.50

THIRD CLASS.	
Chief engineers	$105.00
Assistant engineers	75.00
First mates	90.00
Second mates (when carried)	60.00
Cooks	70.00
Second cooks, to Oct. 1	30.00
Second cooks, Oct. 1 to close of navigation	37.50
Firemen, oilers, and water tenders, to Oct. 1	45.00
Firemen, oilers, and water tenders, Oct. 1 to close of navigation	65.00
Wheelsmen and lookouts, to Oct. 1	45.00
Wheelsmen and lookouts, Oct. 1 to close of navigation	65.00
Ordinary seamen, to Oct. 1	27.50
Ordinary seamen, Oct. 1 to close of navigation	37.50

WOODEN STEAMERS.

FIRST CLASS.	Per month.
Chief engineers	$125.00
Assistant engineers	90.00
First mates	100.00
Second mates	70.00
Cooks	70.00
Second cooks and waiters, to Oct. 1	30.00
Second cooks and waiters, Oct. 1 to close of navigation	37.50
Porters, to Oct. 1	25.00
Porters, Oct. 1 to close of navigation	35.00
Firemen, oilers, and water tenders, to Oct. 1	45.00
Firemen, oilers, and water tenders, Oct. 1 to close of navigation	65.00
Wheelsmen and lookouts, to Oct. 1	45.00
Wheelsmen and lookouts, Oct. 1 to close of navigation	65.00
Ordinary seamen, to Oct. 1	27.50
Ordinary seamen, Oct. 1 to close of navigation	37.50

SECOND CLASS.	
Chief engineers	$114.00
Assistant engineers	84.00
First mates	90.00
Second mates (when carried)	60.00
Cooks	70.00
Second cooks and waiters, to Oct. 1	30.00
Second cooks and waiters, Oct. 1 to close of navigation	37.50
Firemen, oilers, and water tenders, to Oct. 1	45.00
Firemen, oilers, and water tenders, Oct. 1 to close of navigation	65.00
Wheelsmen and lookouts, to Oct. 1	45.00
Wheelsmen and lookouts, Oct. 1 to close of navigation	65.00
Ordinary seamen, to Oct. 1	27.50
Ordinary seamen, Oct. 1 to close of navigation	37.50

BARGES.

Mates on barges shall receive not less than $10 per month more than seamen on the same vessel; and donkey men $5 per month more than seamen.

Mates' wages on tow barges of the larger class (vessels which paid their mates $70 a month last year) shall be $70 per month for the entire season.

Able-bodied seamen on tow barges shall receive $45 per month until October 1, and $65 per month from October 1 to the close of navigation.

The engineers on tow barges carrying towing machines shall receive $67.50.

The cooks on tow barges shall receive the same wages as the seamen on the same barges.

Wages of seamen, firemen, oilers, and water tenders employed in fitting out shall be $1.75 per day while they are not boarded on the vessel.

The provisions of the formal agreements between the owners and the men cover employment only on steamers and tow barges, and do not apply to sailing vessels; nor are the passenger carrying companies parties to the contracts, which will explain the absence of pursers and stewards from the scale of wages. It will be noticed that for employees below the grades of mates and engineers the wages are increased from October 1 to the close of navigation. This is the result of the severity of the weather and the

increased danger and privation that attends the work at that season. In addition to the scale of wages the contracts embody provisions in relation to the number of the various classes of workmen to be employed on vessels of different kinds and sizes; the return of the employees to their homes under certain circumstances; the hours of labor; the conditions and equipment of sleeping quarters, etc.

The greater percentage of increase in the wages paid as compared with that in the number of men, shown in Table 28, indicates that the rates of wages were considerably higher in 1906 than in 1889. This conclusion is borne out by information received from the secretary of the Lake Carriers' Association. Since the association was organized substantial advances have been made in the wages paid to all classes of employees. A comparison carried back to 1887 shows general increases in the compensation of all grades of employees. The following is a comparative statement of the monthly wages paid at certain periods in 1887 and 1906, which, together with other information on the subject, was furnished by the official referred to above:

Monthly wages paid on the Great Lakes: 1906 and 1887.

	Year.	Wages.
First engineer	1906	$105.00 to $175.00
	1887	90.00 to 110.00
Second engineer	1906	75.00 to 115.00
	1887	65.00 to 75.00
First mate	1906	90.00 to 115.00
	1887	65.00 to 80.00
Second mate	1906	60.00 to 80.00
	1887	45.00 to 60.00
First cooks	1906	70.00 to 80.00
	1887	45.00 to 55.00
Cooks' helpers, or second cooks	1906	30.00 to 37.50
	1887	10.00 to 15.00
Wheelsmen and firemen	1906	50.00 to 65.00
	1887	37.50 to 55.00
Watchmen	1906	45.00 to 65.00
	1887	37.50 to 52.50
Deck hands	1906	27.50 to 37.50
	1887	15.00 to 30.00

The range of wages shown in the statement, from the lower rates to the higher, for engineers and mates results from the different classes of vessels upon which they are employed, and for the other employees, marks the difference between summer and winter wages. The annual reports of the Bureau of Navigation contain rates of wages paid to American seamen of the several grades who are employed in the merchant marine in the coastwise and foreign trade from Atlantic and Pacific coast ports. While accurate comparisons can not be made between those figures and the statistics for the Great Lakes, it would appear from an examination of both that on ocean going vessels the range of compensation for employees of the higher grades is much wider than on the freight carrying vessels on the lakes, corresponding to the more widely varying types of craft engaged in ocean transportation.

It is reported by those interested in the commerce of the lakes that the relations between the seamen and their employers are and have been for several years marked by mutual understanding and harmony, with the exception of a few occasions of disagreement which were of a trifling character and soon settled, and that no interruptions to lake traffic of much consequence have occurred within recent years as a result of disagreements concerning the scale of wages.

In addition to the men employed on board vessels, the schedule of inquiry provided that a report should be made of those "employed on land, but incident to the operation of the vessel or craft," together with their wages, such employees to include longshoremen, laborers, etc., and also "officers, managers, clerks, and all other salaried employees." It was reported in reply to this inquiry that in shore work at lake ports there were employed 1,974 officers, managers, clerks, etc., who received as compensation $1,874,357, and 4,363 other employees, such as stevedores, laborers, etc., with wages amounting to $3,015,223. These amounts added to the wages paid to the men employed on vessels make the total amount of $18,170,296 paid as wages and salaries in 1906 to all classes of employees, afloat and ashore.

In reference to the number of shore employees and their wages it should be stated that while the greatest pains were taken to secure complete returns, it is not at all certain that the Office was entirely successful in this regard. The difficulty of securing correct information in answer to this query, especially from the larger transportation companies, makes the figures of questionable accuracy.

The detailed statistics of employees and wages are presented in Table 41 at the end of this report. It will be seen by reference to that table that steam vessels employ about five-sixths of all the wage-earners reported, with sail vessels next, and unrigged vessels the least in number.

FUEL CONSUMPTION.

At the census of 1880 an inquiry was made into the consumption of fuel on steam vessels, and in the special report on steam navigation in the United States for that census it was reported that the fuel used on the Great Lakes amounted to 488,610 tons of coal and 255,629 cords of wood. At the census of 1889, 1,530,997 tons of coal and 85,288 cords of wood were reported as consumed during 1889, these figures being based in part on actual returns and in part on estimates. It is quite probable that the decrease in the quantity of wood reported is an accurate indication of actual conditions, as the use of wood for fuel on steamers has for years steadily decreased until at the present time it can hardly be regarded as a factor in the management of a vessel.

At the census of 1906 the question of fuel consumption was not considered of sufficient statistical impor-

tance to warrant an inquiry into the subject. The Bureau of Statistics, however, makes statistics on this point a feature of its reports on the internal commerce of the United States, and according to the figures of that office the amount of bituminous coal consumed on the Great Lakes during 1906 was 2,703,401 tons. The consumption of anthracite coal for power producing purposes on steam vessels is very small; the quantity reported by the Bureau of Statistics for 1906 was but 2,427 tons, which, however, was probably less than the actual amount consumed.[1]

RAILWAY SHIPPING.

The railway companies form a very important element in the transportation interests of the lakes. Their interests are represented by car ferry lines, which form, usually, a short connecting link between two points of a railway system; by transportation companies, which have a separate corporate organization, but are usually subsidiary to the railroad companies, the whole or a majority of their stock being owned by those companies; and by floating equipment, which is owned and operated directly by the railroad companies and which consists of ferryboats and harbor craft, such as tugboats, lighters, barges, scows, dredges, etc.

The second class of companies named having in a sense independent organizations and keeping separate accounts of their operations were able to and did make very complete reports. Reasonably complete information was obtained in regard to the harbor craft of railroad companies with the exception of certain items of inquiry, such as income, answers to which could not be given in many cases with any degree of accuracy by reason of the peculiar difficulties involved. But it was in connection with the car ferries that the greatest difficulty was encountered in securing full reports. As before stated these form connecting links in railroad lines and transport for short distances whole trains of cars, both freight and passenger; the passengers are undisturbed in their journey and there is no transshipment or unloading and reloading of freight. There was no uncertainty attached to the question of the physical equipment and characteristics of these vessels and this information was supplied without difficulty; but the income received from passengers and freight and the number of passengers and quantity of freight carried presented questions that by some companies could not be answered at all, and by others only approximately.

The statistics reported for the car ferries operated by railroad companies on the Great Lakes are presented in Table 29.

[1] Bureau of Statistics, Department of Commerce and Labor, Monthly Summary, Internal Commerce of the United States, December, 1906, page 578.

TABLE 29.—*Craft operated in connection with steam railroads: 1906.*

Number of vessels	14
Gross tonnage	30,054
Net tonnage	18,252
Horsepower of engines	37,500
Value of vessels	$2,799,482
Number of employees	461
Wages	$225,861
Number of passengers carried	390,708

These statistics are included in the various tables of this report, and are presented separately here on account of their questionable and peculiar character. While there is no question but that these vessels, with their tonnage and value, form a part of the transportation interests of the Great Lakes, it is a matter of some doubt as to whether the passengers and freight carried by them should be considered as features of railway or of water transportation.

It was recognized previous to the canvass that it would be difficult to secure information in regard to the operation of these vessels, and the special agents in the field were instructed that, "where craft are operated as a connecting link in a railway system, the agent will not be required to obtain an estimate of the value of property and of the land force of employees that can be considered as incident to the operation of the craft unless it can be furnished without much difficulty. In such instances the Office will not insist upon answers to the inquiries concerning the gross income, or to the quantity of freight carried." Since freight statistics, as previously explained, were not collected for the Great Lakes by the Bureau of the Census, the inquiry in respect to that subject was not affected. The passengers carried were satisfactorily reported. The answers to the question concerning the income earned by these vessels were, however, very incomplete. There were a number of railway companies that reported car ferries, of which one was unable to segregate from its general accounts the income earned by its ferryboats. This company operated 22.3 per cent of the total tonnage, and this indicates, probably, the measure of the incompleteness of any figures which might have been given to represent income.

The railway companies which operate car ferries on the lakes as connecting links in their systems and the number of boats reported by each are as follows: The Michigan Central Railroad Company, 4 boats running between Detroit, Mich., and Windsor, Ont.; the Manistique, Marquette, and Northern Railroad Company, 1 vessel plying between Northport, Wis., and Manistique, Mich.; the Mackinac Transportation Company, operating 2 vessels between Mackinaw City and St. Ignace, Mich., conjointly for the Michigan Central Railroad Company, the Grand Rapids and Indiana Railway, and the Duluth, South Shore, and Atlantic Railway; and the Pere Marquette system, operating 1 boat between Detroit, Mich., and Windsor, Ont., 1

vessel running from South Chicago, Ill., to Peshtigo harbor, Wis., and 5 boats plying between Ludington, Mich., Milwaukee, Manitowoc, and Kewaunee, Wis., and Muskegon, Michigan.

As these car ferries are essential to the uninterrupted operation of the railway lines, the vessels are strongly constructed for ice breaking purposes in the winter and with a few exceptions compose the entire fleet navigating the lakes during that season. All except 3 of these vessels are of steel construction, the others being built of wood. Eleven are screw propeller steamers and 3 side wheel steamers.

It is not desirable to publish separately the statistics reported for harbor craft owned by railroad companies nor for the water transportation companies which are subsidiary organizations of those companies. The vessels operated by the latter form a not inconsiderable proportion of the total lake tonnage. They are principally engaged in transporting package freight between Chicago, Milwaukee, Gladstone, Duluth, and Superior at the western end of the lakes and Buffalo, Cleveland, Erie, and Fairport at the eastern. In addition to the general merchandise they carried, which in 1906 amounted to 1,572,900 tons for the east bound shipments alone, they are engaged also in transporting the heavier commodities, such as grain, ore, and lumber. Some of the vessels do a considerable passenger business. Most of the general merchandise shipped westward originates on the lines of the railways interested, and is transshipped at Buffalo and the other eastern ports from the railway cars to the boats. Conversely, the eastern shipments from Chicago and Milwaukee are, for the most part, destined for cities tributary to the railroad companies.

The railroads connecting the Atlantic seaboard with the Great Lakes have established lines of vessels on the lakes both to enable them to ship from eastern points by rail and water route to the middle West, and to enable them to secure for their railroad lines in the East as large a share as possible of the traffic originating about and beyond Lakes Superior and Michigan. The transcontinental railroads having lake lines have established such lines in order to secure a greater volume of the through passenger and freight traffic between the eastern and western sections of the United States.[1]

These water transportation companies that are affiliated with, controlled by, or otherwise have traffic arrangements with railroad companies, are organized into what is known as the "Association of Lake Lines." The following is a list of the lines forming its membership in 1906, with the ports between which the boats of each company travel:

Western Transit Company, operating between Buffalo, N. Y., Chicago, Ill., Milwaukee, Wis., Houghton, Mich., Hancock, Mich., Dollar Bay, Mich., Duluth, Minn., and Superior, Wisconsin.

Union Steamboat Line, operating between Buffalo, N. Y., Chicago, Ill., and Milwaukee, Wisconsin.

Erie and Western Transportation Company, operating between Buffalo, N. Y., Erie, Pa., Cleveland, Ohio, Chicago, Ill., Milwaukee, Wis., Detroit, Mich., Port Huron, Mich., Mackinac Island, Mich., Sault Ste. Marie, Mich., Marquette, Mich., and West Superior, Wisconsin.

Mutual Transit Company, operating between Buffalo, N. Y., Cleveland, Ohio, West Fairport, Ohio, Detroit, Mich., Houghton, Mich., Hancock, Mich., Dollar Bay, Mich., Lake Linden, Mich., Port Arthur, Ont., Fort William, Ont., Duluth, Minn., and West Superior, Wisconsin.

Lackawanna Transportation Line, operating between Buffalo, N. Y., Chicago, Ill., and Milwaukee, Wisconsin.

Lehigh Valley Transportation Company, operating between Buffalo, N. Y., Chicago, Ill., and Milwaukee, Wisconsin.

Minneapolis, St. Paul, and Buffalo Steamship Company, operating between Buffalo, N. Y., Cleveland, Ohio, West Fairport, Ohio, Escanaba, Mich., and Gladstone, Michigan.

Cleveland and Buffalo Transit Company, operating between Buffalo, N. Y., and Cleveland, Ohio.

Detroit and Buffalo Steamboat Company, operating between Buffalo, N. Y., and Detroit, Michigan.

Detroit and Cleveland Navigation Company, operating between Cleveland, Ohio, Toledo, Ohio, Detroit, Mich., Port Huron, Mich., St. Clair, Mich., Mackinaw, Mich., and St. Ignace, Michigan.

Canada Atlantic Transit Company, operating between Depot harbor, Ont., Fort William, Ont., Chicago, Ill., Milwaukee, Wis., Duluth, Minn., Superior, Wis., and West Superior, Wisconsin.

Rutland Transit Company, operating between Ogdensburg, N. Y., Cleveland, Ohio, Chicago, Ill., and Milwaukee, Wisconsin.

Port Huron and Duluth Steamship Company, operating between Port Huron, Mich., and Duluth, Minnesota.

Baltimore and Ohio Lake Line, operating between West Fairport, Ohio, Chicago, Ill., and Milwaukee, Wisconsin.

The combined freight capacity of the vessels operated by the above lines is in excess of 200,000 tons. The association prints an annual statement of the east bound movement of the package freight carried by its vessels, and the following statistics, which represent the miscellaneous freight moved eastward by the principal lines for a series of years, are taken from the statement for 1906. The most striking and significant feature of these statistics is the lack of growth indicated in the volume of this commerce. The movement of west bound traffic is also considerable, but a record of such business, it appears, is not kept in any central office.

Eastward movement of package freight by the Association of Lake Lines: 1895 to 1906.

YEAR.	Total (net tons).	From Lake Michigan (net tons).	From Lake Superior (net tons).
1906	1,572,900	967,692	605,208
1905	1,586,258	1,069,503	516,755
1904	1,006,317	620,203	386,114
1903	1,701,458	1,072,708	628,750
1902	1,700,407	909,355	791,052
1901	1,427,515	754,323	673,192
1900	1,574,186	880,425	693,761
1899	1,580,422	918,225	662,197
1898	1,620,996	894,781	726,215
1897	1,950,174	1,120,286	829,888
1896	1,775,640	977,656	797,984
1895	1,430,409	655,705	774,704

CHARACTER OF OWNERSHIP.

An inquiry designed to elicit information in regard to the various forms under which the shipping of the country was owned was made a part of the schedule in order that the extent of each form of ownership—

[1] Emory R. Johnson, Ph. D., "Ocean and Inland Water Transportation." page 356.

individual, firm, incorporated company, and miscellaneous—and their relative proportions might be presented in the statistics. A similar inquiry was not made a part of previous censuses; it is impossible, therefore, to publish comparative data from which the extent of the changes in form of ownership from time to time can be determined.

A statement of the statistics for character of ownership is given in Table 30.

TABLE 30.—*Number, gross tonnage, and value of vessels, by character of ownership, with per cent in each class: 1906.*

OWNERSHIP.	VESSELS.		TONNAGE.		VALUE OF VESSELS.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.
Total	2,990	100.0	2,392,863	100.0	$130,805,640	100.0
Individual	975	32.6	204,175	8.5	8,355,470	6.4
Firm	429	14.3	132,836	5.6	4,025,536	3.1
Incorporated company	1,536	51.4	2,044,131	85.4	117,310,941	89.7
Miscellaneous	50	1.7	11,721	0.5	1,113,693	0.9

The most striking fact shown by these statistics is the great preponderance of the corporate form of ownership. In the light of present day conditions, in this as well as in other fields, it may reasonably be assumed that the incorporated company as a factor in water transportation is constantly increasing in relative importance. The interests concerned in lake commerce are so large that it requires corporate organization to care for them properly. The Pittsburg Steamship Company, a subsidiary company of the United States Steel Corporation, engaged principally in the transportation of iron ore from Lake Superior to Lake Erie, owns approximately one-sixth of the total tonnage on the lakes. Other corporations employ large fleets in transporting the heavier commodities, while the lake lines subsidiary to the railroad companies carry most of the miscellaneous merchandise and their vessels comprise a considerable proportion of the total shipping.

Except in number the vessels under individual ownership are of relatively small importance. The figures indicate that while 32.6 per cent of the total number of vessels was owned by individuals, these vessels were of comparatively small tonnage, the average being 209 gross tons, compared with 1,331 for corporations. Table 41 at the end of this section, in which are presented the detailed statistics, shows the figures reported for yachts owned by individuals, and if these were deducted, it would make a considerable reduction in the percentage of the total number of vessels engaged in lake commerce that were operated by individuals.

Firms rank third in importance in the extent of their operations as lake carriers, and the miscellaneous form of ownership, which includes cooperative associations and municipal and state governments, is last.

Table 31 shows the statistics reported for each form of ownership, according to the occupation of the vessels.

TABLE 31.—NUMBER AND GROSS TONNAGE OF VESSELS, BY CHARACTER OF OWNERSHIP AND BY OCCUPATION: 1906.

CLASS AND OCCUPATION.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	2,990	2,392,863	975	204,175	429	132,836	1,536	2,044,131	50	11,721
Steam	1,676	1,915,786	536	126,160	207	71,009	905	1,714,669	28	3,948
Freight and passenger	932	1,842,251	196	114,702	113	67,317	621	1,659,308	2	924
Tugs and other towing vessels	382	22,663	94	3,592	59	2,226	225	16,446	4	299
Ferryboats	48	35,581	12	693	5	137	30	34,721	1	30
Yachts	236	6,210	204	5,673	23	445	6	66	3	26
All other	78	9,081	30	1,500	7	784	23	4,128	18	2,669
Sail	531	265,571	301	59,578	115	34,900	112	170,267	3	826
Freight and passenger	403	263,837	199	58,321	90	34,428	112	170,267	2	821
Yachts	122	1,458	97	1,170	24	283	.....	.....	1	5
All other	6	276	5	87	1	189	.....	.....	.....	.....
Unrigged	783	211,506	138	18,437	107	26,927	519	159,195	19	6,947

The Lake Carriers' Association.—This association includes in its membership all of the important freight carriers with the exception of a few of the "lake lines" that are affiliated with railroad companies, and of those, the more important are members of the association. The passenger companies are not included in the printed list of members. Its membership owns or represents 68.4 per cent of the total tonnage on the lakes, and it is plain, therefore, that it exercises a commanding influence in all affairs pertaining to the commerce of the lakes. Its objects and purposes are set forth as follows:[1]

1. To establish and maintain shipping offices for the convenient securing of seamen for vessels on the Great Lakes, their connecting and tributary waters.

2. To establish, maintain, and procure the establishment and maintenance of aids to navigation, and improve and secure the improvement of channels, docks, wharves, loading and unloading, and terminal facilities.

[1] Annual Report, Lake Carriers' Association, 1906, page 3.

3. To establish and maintain, by contract or otherwise, such amicable relations between employers and employed as will avoid the public injury that would result from lockouts or strikes in the lake carrying service.

4. To provide for the prompt and amicable adjustment of matters affecting shipping and the interests of vessel owners on the Great Lakes and on their connecting and tributary waters.

CHARACTER OF OPERATIONS.

The schedule of inquiry was framed with a view to securing information in regard to the occupation of the vessels.

TABLE 32.—*All vessels, by occupation, with per cent of increase: 1906 and 1889.*

OCCUPATION.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1906	2,990	2,392,863	$130,805,640
	1889	2,737	920,294	48,580,174
Per cent of increase		9.2	160.0	169.2
Freight and passenger	1906	1,335	2,106,088	114,821,511
	1889	1,760	745,225	41,249,174
Per cent of increase		[1] 24.1	182.6	178.4
Tugs and other towing vessels	1906	382	22,663	2,630,097
	1889	489	24,451	2,556,300
Per cent of increase		[1] 21.9	[1] 7.3	2.9
Ferryboats	1906	48	35,581	3,429,532
	1889	40	4,702	498,000
Per cent of increase		20.0	656.7	588.7
Yachts	1906	358	7,668	1,877,850
	1889	54	2,121	312,700
Per cent of increase		563.0	261.5	500.5
All other	1906	867	220,863	8,046,650
	1889	394	143,795	3,964,000
Per cent of increase		120.0	53.6	103.0

[1] Decrease.

TABLE 33.—*All vessels, by occupation, with per cent each is of total: 1906.*

OCCUPATION.	Number of vessels.	Gross tonnage.	Value of vessels.	Gross income.
Total	2,990	2,392,863	$130,805,640	$65,274,702
Freight and passenger	1,335	2,106,088	114,821,511	56,850,553
Per cent of total	44.6	88.0	87.8	87.1
Tugs and other towing vessels	382	22,663	2,630,097	2,474,121
Per cent of total	12.8	0.9	2.0	3.8
Ferryboats	48	35,581	3,429,532	922,838
Per cent of total	1.6	1.5	2.6	1.4
Yachts	358	7,668	1,877,850	4,494
Per cent of total	12.0	0.3	1.4	[1]
All other	867	220,863	8,046,650	5,022,696
Per cent of total	29.0	9.2	6.2	7.7

[1] Less than one-tenth of 1 per cent.

Vessels employed in carrying freight or passengers are of much greater importance than all others combined, as is shown by the percentages that the tonnage and value of such vessels and their income represent of the totals for the entire lake fleet.

The class of "tugs and other towing vessels" does not include freight propellers which tow barges as well as carry freight.

According to Table 32, the largest percentages of increase are shown for ferryboats and yachts.

CONGRESSIONAL APPROPRIATIONS.

The General Government has for many years expended large sums of money for the improvement and maintenance of waterways and harbors, and, as supplementary to the general statistics, it has been deemed of importance that data pertaining to these expenditures be presented. As the shallowest point in the ship channels of the Great Lakes determines the extreme draught of vessels engaged in interlake commerce, and hence in a measure their carrying capacity, these improvements have therefore a very important relation to the great volume of commerce now carried on in those waters.

It can hardly be assumed that the work that has been done by the Federal Government could have been nearly so well performed by the states or municipalities, either individually or in cooperation. The collection of data in regard to the improvement of lake ports and channels by the states and municipalities was contemplated, but the records and information available were so meager that nothing of value in that line could be accomplished. There is no doubt that such expenditures amount to a large sum in the aggregate.

The following from the Annual Report of the Lake Carriers' Association for 1906 explains the necessity for the continuance of these expenditures:

> The improvement of the channels connecting the Great Lakes to 20 feet has not only reduced the cost of transportation, but the enormous stimulus given to every manufacture has added largely to the population and wealth of the cities encircling these waterways. It is indisputable that our waterways have acted as a most powerful regulator of rates. * * * Major Potter stated in his annual report covering the year 1904 that the saving on freight alone to Lake Superior that year was within five million dollars of all the sums of money ever expended on the whole system of lakes by the Government.

The figures used in this report relative to Congressional appropriations have been compiled from the reports of the Chief of Engineers of the United States Army. The figures are from the compilation of preliminary examinations, surveys, projects, and appropriations prepared in accordance with section 13 of the rivers and harbors act of June 13, 1902, and published in House Document 421, Fifty-seventh Congress, second session, from the report of the chief of

engineers for the fiscal year ending June 30, 1906, and the rivers and harbors act of March 2, 1907. The discrepancies between the figures shown at the present census and those presented at the census of 1890 are due either to the inclusion of some figures in this report under a different locality from the one shown in 1890, to the diversion of appropriations from the original project, or to apparent errors in the earlier census.

Table 34 shows, by periods, the amounts appropriated by Congress for the survey, improvement, and maintenance of the harbors, channels, and tributary streams of the Great Lakes and the St. Lawrence river, allotted to the respective lake or river on which the harbors are located or into which the streams empty.

TABLE 34.—*Congressional appropriations for the survey, improvement, and maintenance of the harbors, channels, and tributary streams of the Great Lakes and St. Lawrence river, by periods and lakes.*

LAKE.	APPROPRIATIONS.			
	Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	$97,791,108	$37,522,937	$50,980,283	$9,287,888
Superior	27,969,410	9,469,000	16,399,410	2,101,000
Huron and St. Clair	10,845,772	3,803,766	4,037,506	2,404,500
Michigan	23,851,630	11,137,784	10,546,394	2,167,452
Erie	26,303,126	9,140,567	14,942,123	2,220,436
Ontario	4,652,981	3,597,631	735,850	319,500
St. Lawrence river	705,506	251,506	379,000	75,000
General	3,462,683	122,683	3,340,000	

The appropriations made up to and including March, 1907, amounted to$ 97,791,108. Of this amount, 38.4 per cent was reported at the census of 1890 and the balance has been appropriated since that year. The amount appropriated by the rivers and harbors act of 1907 was 9.5 per cent of the total.

As may be seen from Table 39 over $17,000,000, or 61.1 per cent of the total amount appropriated for the various localities on Lake Superior, was for the construction and maintenance of the St. Marys Falls canal and the improvement of St. Marys river, which connects Lake Superior with Lake Huron. Nearly $6,000,000, or 21.4 per cent of the entire amount allotted for improvements on Lake Superior, was appropriated for the improvement of the harbors at Duluth, Minn., and Superior, Wisconsin.

Of the localities on Lake Huron and Lake St. Clair which have received Federal aid, the Detroit river, which connects Lake St. Clair with Lake Erie, has had appropriated for its improvement $5,854,500, or over one-half of the total appropriations shown for these two lakes.

The appropriations for localities on Lake Michigan are nearly a quarter of the total for the Great Lakes, the number of harbors and tributary rivers improved exceeding that for any other of the lakes. The largest sums have been appropriated for Chicago harbor and river, Calumet harbor and river, Milwaukee bay and harbor, and Michigan City harbor, the total for these localities amounting to $10,309,555.

The aggregate appropriations for improvements on Lake Erie are next in amount to those for Lake Superior. Erie harbor, Pa., was the first locality on the lakes to receive Congressional aid, the first appropriation being made in 1823. Several harbors of Lake Erie, notably Buffalo, Cleveland, Toledo, Erie, Ashtabula, Sandusky, and Lorain have had over $1,000,000 appropriated for improvements.

Less money has been appropriated for improvements on Lake Ontario than on any other of the Great Lakes, and 47.8 per cent of the total was for the improvement of Oswego harbor.

On the St. Lawrence river less than $1,000,000 has been expended by the United States, and over one-half the entire amount was appropriated for the improvement of Ogdensburg harbor.

The general appropriations, which amount to 3.5 per cent of the total shown in Table 35, were for no specified locality, but were made for such purposes as the construction of dredging machinery and the improvement of the ship channel of the Great Lakes.

Table 35 shows the appropriations for the different states which lie around the Great Lakes. In some instances, however, it has been impossible to segregate appropriations for localities lying in two states.

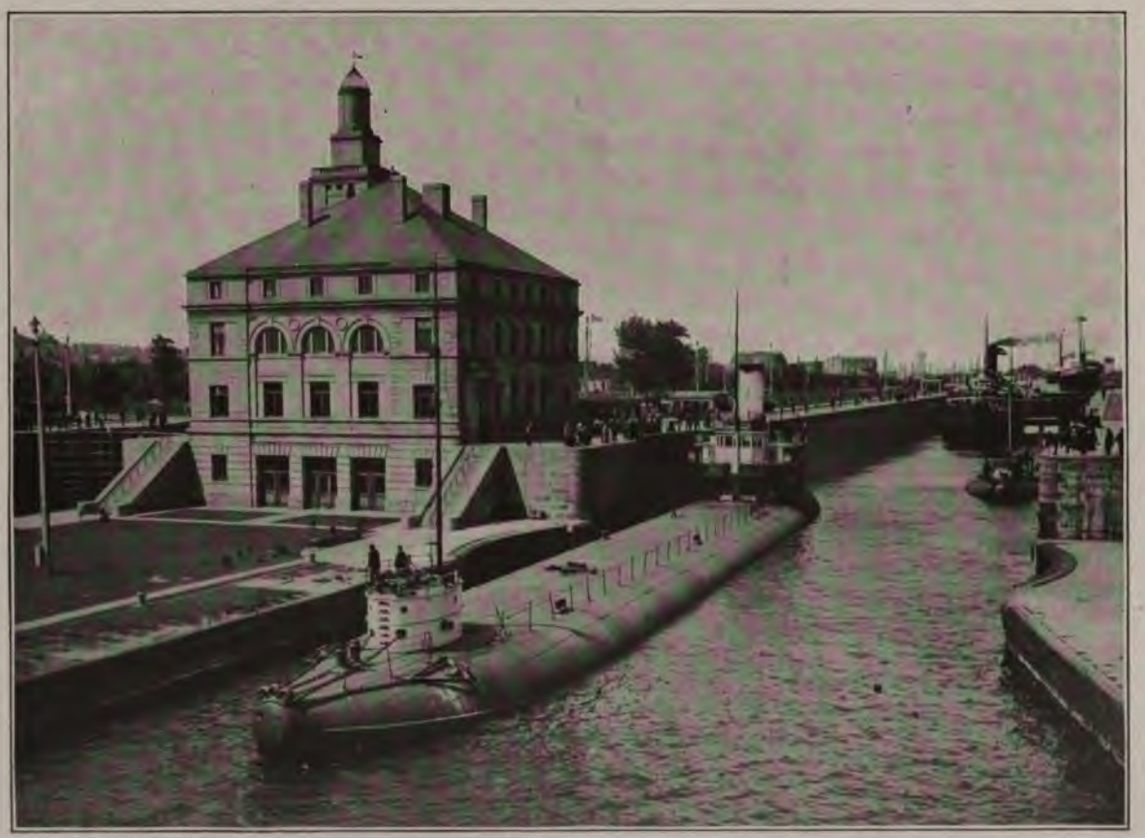
TABLE 35.—*Congressional appropriations for the survey, improvement, and maintenance of the harbors, channels, and tributary streams of the Great Lakes and St. Lawrence river, by periods and states.*

STATE.	APPROPRIATIONS.			
	Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	$97,791,108	$37,522,937	$50,980,283	$9,287,888
Illinois	6,265,192	2,701,405	2,943,787	620,000
Indiana	1,651,669	1,118,169	473,500	60,000
Michigan	39,859,504	15,652,949	19,799,103	4,407,452
Minnesota	425,058	179,850	236,208	9,000
New York	15,417,423	7,176,325	6,310,152	1,930,936
Ohio	14,478,618	4,675,987	9,250,631	552,000
Pennsylvania	1,436,867	891,867	425,000	120,000
Wisconsin	7,442,708	3,330,498	3,445,210	667,000
Illinois and Indiana [1]	974,219	180,000	602,719	191,500
Michigan and Wisconsin [2]	404,420	266,000	133,420	5,000
Minnesota and Wisconsin [3]	5,972,747	1,227,194	4,020,553	725,000
General	3,462,683	122,683	3,340,000	

[1] Calumet river.
[2] Menominee harbor and river.
[3] Duluth harbor, Minnesota, and Superior harbor, Wisconsin.

Of the different states, Michigan shows more than a third of the aggregate appropriated. This is due to the large appropriations made for the improvements in St. Marys and Detroit rivers, as well as to the fact that more localities on the shores of this state than of any

MAKING A LOCKAGE IN THE SOO CANAL, ST. MARYS RIVER AT THE FALLS, MICHIGAN.



WHALEBACK PASSING THROUGH THE SOO CANAL.

other on the Great Lakes have received Federal assistance. Large appropriations have also been made for harbors in New York, Ohio, Wisconsin, and Illinois.

By reference to Table 39, which shows the appropriations by localities, it will be seen that, ranked according to the amount of appropriations, the leading localities are as follows: St. Marys river and canal, Buffalo and Black Rock harbors, Duluth and Superior harbors, Detroit river, Cleveland harbor, Chicago harbor and river, Toledo harbor, Oswego harbor, and Milwaukee bay and harbor. The appropriations for these localities aggregate $53,720,569, or 54.9 per cent of all appropriations for improvements on the Great Lakes and St. Lawrence river.

Owing to the constantly increasing commerce of these waters, Congress authorized, by the rivers and harbors act of July, 1892, the improvement of the channel connecting the waters of the Great Lakes between Chicago, Duluth, and Buffalo by excavating channels to a minimum width of 300 feet, with a navigable depth of 20 feet, through the shoal places in the specified waters, at an estimated cost of $3,340,000. The improvement was limited to shoals not already provided for and was completed in 1897. The rivers and harbors act of March, 1905, authorized a preliminary examination and survey, with a view to enlarging the channel to depths of 22 and 25 feet, respectively, and to sufficient width. In the latter part of 1906 the board of engineers for rivers and harbors recommended that the contemplated improvement should be deferred until it was evident that a safe and reliable 20-foot channel was not equal to the necessities of lake commerce, although it did recommend an auxiliary channel in the Detroit river 22 feet deep, and this latter improvement was authorized by the rivers and harbors act of March, 1907, at an estimated cost of about $6,500,000.

The increasing commerce passing through the St. Marys Falls canal has necessitated the construction of a third lock on the American side of the river. The rivers and harbors act of March, 1907, authorized the commencement of work on this new lock, which is north of the Poe lock, and is to be 1,350 feet long, 80 feet wide, and of 24.5 feet minimum depth. A new canal approach is also to be constructed, having a width of from 260 to 300 feet and the necessary depth. The total cost of this improvement is estimated at about $6,000,000.

In order to illustrate the important bearing that these improvements, particularly those of the Sault canals and Detroit river and St. Clair Flats canal, have upon the commerce of the lakes, the following statistics, taken from the Annual Report of the Chief of Engineers of the United States Army for the fiscal year ending June 30, 1906, are introduced:

TABLE 36.—*Statistical report of lake commerce through canals at Sault Ste. Marie, Michigan and Ontario, for the fiscal year ending June 30, 1906.*[1]

ITEM.	Total.	United States canal.	Canadian canal.
Vessel passages, number	21,957	16,299	5,658
Lockages, number	14,118	10,016	4,102
Net tonnage:			
Registered	37,570,191	32,559,602	5,010,589
Freight	46,015,016	41,276,862	4,738,154
Passengers, number	55,331	29,344	25,987
Coal:			
Hard, net tons	882,447	834,702	47,745
Soft, net tons	6,062,752	5,212,511	850,241
Flour, barrels	6,151,853	4,556,985	1,594,868
Wheat, bushels	78,769,762	51,146,562	27,623,200
Grain, other than wheat, bushels	48,128,812	40,004,666	8,124,146
Manufactured and pig iron, net tons	307,999	244,626	63,373
Salt, barrels	404,576	294,003	110,573
Copper, net tons	105,142	96,283	8,859
Iron ore, net tons	31,887,544	29,828,694	2,058,850
Lumber, M feet B. M	964,407	929,141	35,266
Silver ore, net tons	41	41	.....
Building stone, net tons	6,261	6,261	.....
General merchandise, net tons	978,473	523,687	454,786

[1] Annual Report, Chief of Engineers, United States Army, 1906, Part II, page 1860.

According to the reports of the Bureau of Statistics, 60,577,608 net tons of freight passed through the Detroit river during the navigation season of 1906. This considerably exceeded the traffic through the St. Marys Falls canal.

TABLE 37.—*Domestic freight movement through the Detroit river: 1906.*[1]

ARTICLE.	North bound.	South bound.	Total.
Coal, hard.....tons (net)..	2,960,920	.....	2,960,920
Coal, soft.....tons (net)..	11,561,111	.....	11,561,111
Flour.....tons (net)..	872	1,237,652	1,238,524
Wheat.....bushels..	.....	46,968,671	46,968,671
Corn.....bushels..	.....	32,086,383	32,086,383
Oats.....bushels..	.....	24,311,170	24,311,170
Barley.....bushels..	.....	14,786,080	14,786,080
Rye.....bushels..	.....	1,328,517	1,328,517
Flaxseed.....bushels..	.....	17,758,376	17,758,376
Iron ore.....tons (gross)..	12,506	32,208,009	32,220,515
Iron, pig.....tons (gross)..	5,895	337,086	342,981
Iron manufactures...tons (gross)..	453,809	1,437	455,246
Salt.....tons (net)..	74,401	41,463	115,864
Copper.....tons (gross)..	.....	89,534	89,534
Logs.....M feet..	.....	1,257	1,257
Lumber.....M feet..	9,796	869,254	879,050
Unclassed freight.....tons (net)..	1,303,082	966,738	2,269,780
Total.....tons (net)..	16,448,812	44,128,796	60,577,608

[1] Bureau of Statistics, Department of Commerce and Labor, Monthly Summary, Internal Commerce of the United States, December, 1906.

It should be remembered that the statistics in Table 36 include Canadian commerce, which, it is estimated, forms about 5 per cent of the whole with respect to the tonnage of freight, as well as American, and therefore will not bear strict comparison with the general statistics of transportation on the lakes published elsewhere in this report. It is clear, however, that a very large proportion of the traffic passes through these channels, and that they really are the key to the whole lake system of navigation. It is therefore vitally essential that their improvement should be equal to the demands of the constantly increasing traffic.

Another improvement which was authorized by the rivers and harbors act of March, 1905, is to provide a

channel for deep draft vessels between Buffalo and Tonawanda around the rapids at the head of Niagara river. This is to be accomplished by widening Black Rock harbor, situated at the head of Niagara river, by removing the wall which separates it from the Erie canal, thus making it from 250 to 500 feet wide, and deepening the waterway sufficiently to accommodate the largest vessels of the lakes. A lock 650 feet long and 70 feet wide at its downstream end is to overcome the fall of the river. When completed, any vessel engaged in lake commerce can pass from Lake Erie into the natural harbor of the Niagara river below the shoals and rapids at its head. This improvement would also be an essential part of any plan for a ship canal from the lakes to the sea, and will fit into the plan for the enlarged Erie canal.

Table 38, which gives the maximum draft that can be carried at mean low water in the main channels and canals, and in the principal harbors of the Great Lakes, according to the latest surveys and improvements, shows in part the results that have been accomplished.

TABLE 38.—*Maximum draft that can be carried at mean low water in channels and harbors.*[1]

HARBORS.

	Depth.		Depth.
	Feet.		*Feet.*
Ashland	18	Ludington	18
Ashtabula	20	Manistee	15
Buffalo	23	Manitowoc	20
Chicago	20	Marine City	15
Cleveland	24	Marquette	18
Conneaut	20	Menominee	19
Detroit	21	Milwaukee	21
Duluth	20	Muskegon	17
Erie	20	Ogdensburg	15
Fairport	20	Port Huron	16
Frankfort	18	Racine	18
Grand Haven	18	Sandusky	18
Hancock-Houghton	20	Sheboygan	20
Kewaunee	16	Superior-West Superior	20
Lorain	20	Toledo	20

CHANNELS AND CANALS.

Detroit river	21	St. Marys canal and river	25
Lake Superior canal	20	Sturgeon Bay canal	21
St. Clair Flats canal	20		

[1] Annual Reports of the Chief of Engineers, United States Army.

Table 39 gives the Congressional appropriations by localities and periods.

TABLE 39.—CONGRESSIONAL APPROPRIATIONS FOR THE SURVEY, IMPROVEMENT, AND MAINTENANCE OF THE HARBORS, CHANNELS, AND TRIBUTARY STREAMS OF THE GREAT LAKES AND ST. LAWRENCE RIVER, BY LOCALITIES AND PERIODS.

LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Aggregate		$97,791,108	$37,522,937,	$50,980,283	$9,287,888
Lake Superior	1856	27,969,410	9,469,000	16,399,410	2,101,000
Agate Bay harbor, Minn	1886	252,708	62,500	186,208	4,000
Ashland harbor, Wis	1896	464,500	142,500	232,000	90,000
Duluth harbor, Minn., and Superior harbor, Wis	1867	5,972,747	1,227,194	4,020,553	725,000
Eagle harbor, Mich	1867	97,000	97,000		
Grand Marais harbor, Minn	1879	172,350	117,350	50,000	5,000
Grand Marais harbor of refuge, Mich	1880	485,598	231,250	224,348	30,000
Keweenaw Point waterway, Mich	1886	1,891,675	380,000	1,511,675	
Marquette harbor, Mich	1867	697,230	394,230	273,000	30,000
Ontonagon harbor, Mich	1867	368,100	308,100	55,000	5,000
Presque Isle harbor of refuge, Mich	1896	58,500		58,500	
Portage Lake harbor of refuge, Mich	1879	379,500	100,500	269,000	10,000
Port Wing harbor, Wis	1902	46,992		44,992	2,000
St. Marys river, falls, and canal, including Hay Lake and Neebish channels, Mich	1856	17,082,510	6,408,376	9,474,134	1,200,000
Lakes Huron and St. Clair	1852	10,845,772	3,803,766	4,637,506	2,404,500
Alpena harbor, Mich	1876	55,500	35,000	16,500	4,000
Au Sable river and harbor, Mich	1867	113,970	113,970		
Belle river, Mich	1881	29,000	14,000	15,000	
Black river, Mich	1888	96,000	45,000	45,000	6,000
Cheboygan harbor, Mich	1871	198,500	148,000	35,500	15,000
Clinton river, Mich	1852	80,564	51,500	26,564	2,500
Detroit river, Mich	1874	5,854,500	703,000	3,001,500	2,150,000
Pine river, Mich	1875	15,560	5,000	10,560	
St. Clair river and canal, Mich	1852	1,445,928	944,546	501,382	
Saginaw river, Mich	1866	943,750	568,750	300,000	75,000
Sand Beach harbor of refuge, Mich	1871	1,953,500	1,160,000	643,500	150,000
Sebewaing river, Mich	1875	59,000	15,000	42,000	2,000
Lake Michigan	1826	23,851,630	11,137,784	10,546,394	2,167,452
Algoma (Ahnapee) harbor, Wis	1871	249,000	166,000	40,000	43,000
Arcadia harbor, Mich	1905	12,000		6,000	6,000
Calumet harbor, Ill	1870	1,567,230	432,400	1,114,830	20,000
Calumet river, Ill. and Ind	1884	974,219	180,000	602,719	191,500
Cedar River harbor, Mich	1882	30,000	30,000		
Chicago harbor and river, Ill	1833	4,037,462	2,104,005	1,383,457	550,000
Charlevoix harbor, Mich	1876	220,500	102,500	98,000	20,000
Frankfort harbor, Mich	1866	478,160	273,660	184,500	20,000
Gladstone harbor, Mich	1905	14,000		14,000	
Grand Haven harbor, Mich	1852	918,866	623,866	245,000	50,000
Grand river, Mich	1881	513,000	50,000	375,000	88,000
Green Bay harbor, Wis	1866	529,078	297,550	226,528	5,000
Holland (Black Lake) harbor, Mich	1852	702,767	274,615	289,700	138,452
Kalamazoo river, Mich	1896	175,000		175,000	[1]
Kenosha harbor, Wis	1844	516,307	245,307	249,000	22,000
Kewaunee harbor, Wis	1881	177,800	75,000	97,800	5,000
La Plaisance bay, Mich	1826	19,714	19,714		
Ludington harbor, Mich	1867	763,435	352,435	311,000	100,000

[1] Included with appropriation for Saugatuck harbor.

TABLE 39.—CONGRESSIONAL APPROPRIATIONS FOR THE SURVEY, IMPROVEMENT, AND MAINTENANCE OF THE HARBORS, CHANNELS, AND TRIBUTARY STREAMS OF THE GREAT LAKES AND ST. LAWRENCE RIVER, BY LOCALITIES AND PERIODS—Continued.

LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Lake Michigan—Continued.					
Manistee harbor, Mich	1867	$472,000	$298,000	$149,000	$25,000
Manistique harbor, Mich	1880	56,000	6,000	25,000	25,000
Manitowoc harbor, Wis	1852	658,560	307,820	250,740	100,000
Menominee harbor and river, Mich. and Wis	1871	404,420	266,000	133,420	5,000
Michigan City harbor, Ind	1836	1,643,669	1,118,169	465,500	60,000
Milwaukee bay and harbor and harbor of refuge, and South Milwaukee, Wis	1836	2,086,975	881,087	1,005,888	200,000
Muskegon harbor, Mich	1867	779,500	329,000	375,500	75,000
New Buffalo harbor, Mich	1852	83,000	83,000	.....	.....
Oconto harbor, Wis	1881	96,000	68,000	28,000	.....
Pensaukee harbor, Wis	1882	16,000	15,000	1,000	.....
Pentwater harbor, Mich	1867	325,820	233,820	72,000	[1] 20,000
Petoskey harbor, Mich	1890	125,500	15,000	93,000	[2] 17,500
Port Washington harbor, Wis	1870	204,900	177,500	27,400	.....
Racine harbor, Wis	1844	560,720	264,785	245,935	50,000
St. Josephs harbor and river, Mich	1836	888,563	370,613	501,950	16,000
Saugatuck harbor, Mich	1868	292,239	140,439	76,800	[3] 75,000
Sheboygan harbor, Wis	1852	623,071	318,449	264,622	40,000
South Haven harbor, Mich	1867	407,300	207,000	160,300	40,000
Sturgeon Bay and Lake Michigan Ship Canal and harbor of refuge, Wis	1873	873,705	168,000	685,705	20,000
Two Rivers harbor, Wis	1871	339,100	203,500	45,600	90,000
Waukegan harbor, Ill	1852	660,500	165,000	445,500	50,000
White Lake harbor, Mich	1867	347,550	274,550	73,000	([3])
Wolf Lake outlet, Ind	1896	8,000	.....	8,000	.....
Lake Erie	1823	26,303,126	9,140,567	14,942,123	2,220,436
Ashtabula harbor, Ohio	1826	1,389,069	468,211	900,858	20,000
Black River (Lorain) harbor, Ohio	1828	1,063,205	232,205	801,000	30,000
Buffalo and Black Rock harbors, N. Y	1820	8,267,873	2,520,093	4,214,344	1,533,436
Cattaraugus creek, N. Y	1836	57,410	57,410	.....	.....
Cleveland harbor, Ohio	1825	5,596,189	1,523,632	3,849,557	223,000
Conneaut harbor, Ohio	1829	867,097	112,629	735,068	20,000
Cunningham creek, Ohio	1826	19,781	19,781	.....	.....
Dunkirk harbor, N. Y	1827	984,837	511,579	473,258	.....
Erie harbor, Pa	1823	1,436,867	891,867	425,000	120,000
Fairport harbor, Ohio	1825	950,734	320,874	529,860	100,000
Huron harbor, Ohio	1826	511,774	139,274	356,500	16,000
Monroe harbor, Mich	1835	262,440	225,515	31,500	5,425
Port Clinton harbor, Ohio	1872	104,000	66,000	35,000	3,000
Portland harbor, N. Y	1836	56,616	56,616	.....	.....
Rocky River harbor, Ohio	1872	39,000	39,000	.....	.....
Rouge river, Mich	1888	66,265	20,000	39,690	6,575
Sandusky harbor and river, Ohio	1826	1,175,192	418,480	631,712	125,000
Toledo harbor, Ohio	1866	2,598,700	1,209,200	1,389,500	.....
Tonawanda harbor and Niagara river, N. Y	1881	692,200	181,500	507,700	3,000
Vermilion harbor, Ohio	1836	163,277	126,701	21,576	15,000
Lake Ontario	1826	4,652,981	3,597,631	735,850	319,500
Black River harbor, N. Y	1836	42,401	42,401	.....	.....
Charlotte harbor, N. Y	1828	753,328	469,328	195,500	88,500
Great Sodus Bay harbor, N. Y	1829	547,497	437,647	59,850	50,000
Little Sodus Bay harbor, N. Y	1852	470,442	310,942	84,500	75,000
Oak Orchard harbor, N. Y	1836	207,250	205,000	2,250	.....
Olcott harbor, N. Y	1867	178,000	163,000	15,000	.....
Oswego harbor, N. Y	1826	2,223,613	1,765,613	358,000	100,000
Port Ontario harbor, N. Y	1836	50,000	50,000	.....	.....
Pultneyville harbor, N. Y	1870	85,000	73,000	6,000	6,000
Sacketts Harbor harbor, N. Y	1826	20,000	15,000	5,000	.....
Sandy Creek, N. Y	1828	300	300	.....	.....
South shore of Lake Ontario, harbors of	1828	400	400	.....	.....
Wilson harbor, N. Y	1875	74,750	65,000	9,750	.....
St. Lawrence river	1852	705,506	251,506	379,000	75,000
Cape Vincent harbor, N. Y	1896	128,000	.....	128,000	.....
Grass river, N. Y	1882	9,000	9,000	.....	.....
Ogdensburg harbor, N. Y	1852	417,006	202,006	140,000	75,000
St. Lawrence river, N. Y	1890	116,000	5,000	111,000	.....
Waddington harbor, N. Y	1873	35,500	35,500	.....	.....
General appropriations	1836	3,462,683	122,683	3,340,000	.....
Dredging machinery	1836	122,683	122,683	.....	.....
Ship channel, Great Lakes	1892	3,340,000	.....	3,340,000	.....

[1] Includes appropriation for White Lake harbor. [2] Includes appropriation for Kalamazoo river. [3] Included with appropriation for Pentwater harbor.

POPULATION AND LAKE COMMERCE.

In the special report on lake transportation, at the census of 1890, a tabular statement showing the population in 1880 and 1890 of cities of 8,000 inhabitants and over, located within a radius of 50 miles of the Great Lakes and St. Lawrence river, was presented for the purpose of indicating the parallelism between the increase of population in the regions contiguous

to the lakes and the growth of lake commerce. A similar table is presented here, but only lake ports for which there are for 1906 port records of the receipt or shipment of freight are included. The cities that are not situated on navigable waters of the lakes are omitted, for the reason that there is but a remote relationship, if any, between their development and that of the commerce of the lakes.

TABLE 40.—*Population of lake ports of 8,000 population and over: 1880 to 1900.*

	1900	1890	1880
Aggregate	3,670,243	2,496,919	1,319,050
Lake Superior	117,730	69,907	11,726
Ashland, Wis[1]	13,074	9,956	951
Duluth, Minn	52,969	33,115	3,483
Marquette, Mich	10,058	9,093	4,690
Sault Ste. Marie, Mich	10,538	5,760	1,947
Superior, Wis[1]	31,091	11,983	655
Lakes Huron and St. Clair	344,292	258,541	152,069
Alpena, Mich	11,802	11,283	6,153
Bay City, Mich	27,628	27,839	20,693
Detroit, Mich	285,704	205,876	116,340
Port Huron, Mich	19,158	13,543	8,883
Lake Michigan	2,185,353	1,450,001	701,518
Chicago, Ill	1,698,575	1,099,850	503,185
Escanaba, Mich	9,549	6,808	3,026
Green Bay, Wis	18,684	9,069	7,464
Kenosha, Wis	11,606	6,532	5,039
Manistee, Mich	14,260	12,812	6,930
Manitowoc, Wis	11,786	7,710	6,367
Marinette, Wis	16,195	11,523	2,750
Menominee, Mich	12,818	10,630	3,288
Michigan City, Ind	14,850	10,776	7,366
Milwaukee, Wis	285,315	204,468	115,587
Muskegon, Mich	20,818	22,702	11,262
Racine, Wis	29,102	21,014	16,031
Sheboygan, Wis	22,962	16,359	7,314
Traverse City, Mich	9,407	4,833	1,897
Waukegan, Ill	9,426	4,915	4,012
Lake Erie	988,036	684,966	422,280
Ashtabula, Ohio	12,949	8,338	4,445
Buffalo, N. Y	352,387	255,664	155,134
Cleveland, Ohio	381,768	261,353	160,146
Dunkirk, N. Y	11,616	9,416	7,248
Erie, Pa	52,733	40,634	27,737
Lorain, Ohio	16,028	4,863	1,595
North Tonawanda, N. Y	9,069	4,793	.....
Sandusky, Ohio	19,664	18,471	15,838
Toledo, Ohio	131,822	81,434	50,137
Lake Ontario and St. Lawrence river	34,832	33,504	31,457
Ogdensburg, N. Y	12,633	11,662	10,341
Oswego, N. Y	22,199	21,842	21,116

[1] Township figures for 1880.

It is an interesting subject of speculation to attempt to measure the extent of the influence exerted upon the general progress of these cities by their situation as lake ports. It may be regarded as an established fact that their original location was the direct result of their situation; their subsequent development, however, may have been in part produced by other causes.

The great wave movements of the population from the older countries to the newer which have resulted from the increase in population or from other causes, have been generally along the natural highways to regions of better natural resources, and the early settlement of the lake region and its subsequent development have been characterized by all the phases which have marked similar movements elsewhere.

The first settlements along these waters were the military posts made necessary for defensive and strategic purposes, by the fact that the lakes formed the boundary between the British colonies and the French dominions, and later between the United States and Canada. These posts were located at the most advantageous points for aggression and defense at river mouths and on the channels between the lakes, and naturally formed central points of future populous settlements by attracting many to their vicinity for protection against the Indians and for better social intercourse. The fur trading stations also were in some cases the nuclei of what are now important cities.

A comparison of the statistics of population for certain cities shown in Table 40 with the figures for the receipts and shipments of freight in Table 17 discloses some interesting parallels. If the aggregate figures in both tables are compared, it is seen that the growth in population has been accompanied by a greater growth in lake commerce. It is by comparison of the figures for individual cities, however, that the most marked effects of this commerce upon population may be observed. With the exception of Marquette, Mich., all the cities shown for Lake Superior exhibit substantial increases in their population, and it is not an unreasonable conclusion that the great development of the traffic in iron ore and grain was largely responsible for this growth. The freight statistics show that the shipments of iron ore, which is the principal source of Marquette's lake traffic, were about equal for that port in 1906 and 1889, and to this fact may be attributed the slight increase in population from 1890 to 1900.

The decay of the lumber industry and the consequent decrease in the shipments from Alpena and Bay City on Lake Huron, are accompanied by an arrested growth of the population of those cities. Detroit, in so far as its receipts and shipments of lake freight are concerned, is not an important port considering its population, but its other interests, manufacturing and commercial, are so large that the growth of the city is not materially affected.

The effect that the exhaustion of the timber supply has had in retarding the growth of cities is also observed in several of the cities on Lake Michigan. This is notably the case with Muskegon, which, during the decade from 1890 to 1900, suffered a loss in population. From 1889 to 1906, as shown by Table 17, the receipts of lake freight at the port declined very much, while its shipments dwindled to about one-fourteenth of their former proportions.

Of the ports on Lake Erie, with but a single exception—Sandusky, Ohio, which shows but a slight increase in population—the cities included in Table 40 have made very large increases in their population, and it may fairly be assumed that the enormous increase in their lake commerce has exerted no small influence in promoting this growth.

Finally, Ogdensburg and Oswego, ports on the St. Lawrence river and Lake Ontario, respectively, have remained almost stationary in population at the

last three censuses, and this condition has been accompanied by a steadily diminishing importance of American commerce on those waters.

In connection with the lessening importance of the lumber ports, it may be said that in some of the cases cited, the shipment of this commodity is but incident to its manufacture, so that it may reasonably be claimed that the arrested development noted is caused by the reduction in their importance in that regard rather than in the concomitant decrease in shipments. This can not, however, be said of those ports which derive their importance from the volume of receipts or shipments of other commodities, for example, iron ore and grain. In such cases the cities are not directly affected by the production of these staples, the source of which is more or less remote, but are affected only as they afford an outlet to distant markets or as they stand as receiving ports.

CONCLUSION.

The chain of Great Lakes forms the natural highway for the transportation of the great staples of the Northwest from the farm, factory, forest, and mine to eastern points of consumption, and for the shipment westward of coal, principally, and of other merchandise in smaller proportions, when the charge for breaking bulk does not exceed the difference between the rail and the water rate and when the greater length of time required is not of serious moment.

The continued expansion of the shipping interests in the future must depend chiefly upon the transportation of these bulky commodities, such as iron ore, grain, and coal; but there is also much room for greater development in the transportation of the lighter miscellaneous merchandise and for improvement in the methods of handling it at the wharves in the shape of better depot, warehouse, and terminal facilities. In recognition of these facts new freight vessels of large tonnage are constantly being added to the lake fleet, although this can not continue indefinitely without increasing the depth of the main channels, while the lakes will share with the rest of the world the advantages of whatever progress may be made in the future in ship and engine construction.

The general interest now being manifested in the improvement of the waterways of the country will probably result in greater attention being paid to the needs of the lakes. In view of this widespread interest the remarks of Alexander Hamilton in regard to the improvement of navigation seem singularly pertinent at this time.

> The symptoms of attention to the improvement of inland navigation, which have lately appeared in some quarters, must fill with pleasure every breast warmed with a true zeal for the prosperity of the country. * * * This is one of those improvements which could be prosecuted with more efficacy by the whole than by any part or parts of the Union.[1]

A great desideratum, in particular in connection with lake navigation, undoubtedly is better communication within the United States between Lakes Erie and Ontario.

As early as 1853 James Fenimore Cooper, in the preface to one of his works of fiction, forecasted the progress that would be made in the region of the Great Lakes:

> Ontario in our time has been the scene of important naval evolutions. Fleets have maneuvered on those waters, which half a century ago were as deserted as waters well can be; and the day is not distant when the whole of that vast range of lakes will become the seat of empire and fraught with all the interests of human society.[2]

This prevision of events was but a faint conception of the actual developments, and it was little thought at that time that Ontario would prove the least important member of this great system of commercial highways.

The merchant marine of the Great Lakes considered in all its aspects can not but be regarded as a highly beneficent element of the commercial interests of the United States. It is in freight reduction and regulation that its greatest benefits are felt, although the profits received by those participating directly in the trade and the wages paid to those employed by it are not inconsiderable.

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[1] Alexander Hamilton, Secretary of the Treasury, Report on the Subject of Manufactures, page 238.

[2] The Pathfinder, preface.

TABLE 41.—ALL VESSELS, BY CLASS,

	CLASS, OCCUPATION, AND OWNERSHIP.	Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
1	Aggregate	2,990	2,392,863	1,905,176	1,616	51	8	1	976,847	5,700	8
2	Steam	1,676	1,915,786	1,452,228	1,616	51	8	1	976,847	5,700	8
3	Freight and passenger	932	1,842,251	1,406,674	890	37	5		811,004	1,333	
4	Tugs and other towing vessels	382	22,663	13,312	376	5	1		89,451	164	
5	Ferryboats	48	35,581	21,621	43	3	1	1	49,001	116	
6	Yachts	236	6,210	4,280	235		1		12,387	3,923	8
7	All other	78	9,081	6,341	72	6			15,004	164	
8	Individual	536	126,160	97,555	527	8	1		10,606	4,733	8
9	Freight and passenger	196	114,702	89,888	192	4			65,232	986	
10	Tugs and other towing vessels	94	3,592	2,084	93	1			11,494	68	
11	Ferryboats	12	693	431	11		1		1,121	70	
12	Yachts	204	5,673	3,880	204				11,408	3,445	8
13	All other	30	1,500	1,272	27	3			1,351	164	
14	Firm	207	71,009	54,402	202	3	2		55,957	515	
15	Freight and passenger	113	67,317	52,071	112	1			43,409	228	
16	Tugs and other towing vessels	59	2,326	1,338	57	1	1		10,668	16	
17	Ferryboats	5	137	93	5				160	6	
18	Yachts	23	445	318	22		1		979	265	
19	All other	7	784	582	6	1			741		
20	Incorporated company	905	1,714,669	1,297,949	859	40	5	1	818,058	370	
21	Freight and passenger	621	1,659,308	1,264,024	584	32	5		701,423	119	
22	Tugs and other towing vessels	225	16,446	9,718	222	3			65,888	80	
23	Ferryboats	30	34,721	21,072	26	3		1	47,720		
24	Yachts	6	66	58	6					171	
25	All other	23	4,128	3,077	21	2			3,027		
26	Miscellaneous	28	3,948	2,322	28				12,226	82	
27	Freight and passenger	2	924	691	2				940		
28	Tugs and other towing vessels	4	299	172	4				1,401		
29	Ferryboats	1	30	25	1					40	
30	Yachts	3	26	24	3					42	
31	All other	18	2,669	1,410	18				9,885		
32	Sail	531	265,571	249,535							
33	Freight and passenger	403	263,837	247,891							
34	Yachts	122	1,458	1,384							
35	All other	6	276	260							
36	Individual	301	59,578	56,586							
37	Freight and passenger	199	58,321	55,395							
38	Yachts	97	1,170	1,110							
39	All other	5	87	81							
40	Firm	115	34,900	33,032							
41	Freight and passenger	90	34,428	32,584							
42	Yachts	24	283	269							
43	All other	1	189	179							
44	Incorporated company	112	170,267	159,137							
45	Freight and passenger	112	170,267	159,137							
46	Yachts										
47	All other										
48	Miscellaneous	3	826	780							
49	Freight and passenger	2	821	775							
50	Yachts	1	5	5							
51	All other										
52	Unrigged	783	211,506	203,413							
53	Canal boats	6	1,134	1,122							
54	All other	777	210,372	202,291							
55	Individual	138	18,437	18,055							
56	Canal boats	2	264	262							
57	All other	136	18,173	17,793							
58	Firm	107	26,927	25,320							
59	Canal boats										
60	All other	107	26,927	25,320							
61	Incorporated company	519	159,195	153,346							
62	Canal boats	4	870	860							
63	All other	515	158,325	152,486							
64	Miscellaneous	19	6,947	6,692							
65	Canal boats										
66	All other	19	6,947	6,692							

OCCUPATION, AND OWNERSHIP: 1906.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	
Iron.	Steel.	Wood.	Composite.		Freight.	Passengers	All other.				
33	539	2,391	27	$130,805,640	$52,076,533	$4,866,904	$8,331,265	24,916	$13,280,716	14,080,146	1
32	457	1,172	15	116,963,812	47,227,424	4,866,904	4,245,899	20,515	11,179,882	14,080,146	2
24	388	510	10	107,897,440	46,832,834	4,408,880	1,271,337	17,279	9,269,490	5,814,639	3
6	33	342	1	2,630,097	357,944	1,168	2,115,009	1,659	1,081,913	1,025	4
.....	14	34	.....	3,429,532	.....	456,856	465,982	656	308,156	8,264,482	5
2	10	220	4	1,673,000	.....	.....	4,422	441	151,055	.....	6
.....	12	66	.....	1,353,743	36,646	.....	389,149	480	369,268	.....	7
11	30	487	8	6,664,550	2,639,573	297,043	671,897	2,503	1,216,624	1,333,019	8
7	17	169	3	4,509,800	2,566,193	267,163	160,896	1,592	824,373	1,081,178	9
2	5	86	1	440,050	73,380	1,168	348,394	359	183,589	1,025	10
.....	.....	12	.....	66,800	.....	28,712	3,600	37	11,773	250,816	11
2	8	190	4	1,544,700	.....	.....	4,350	406	141,673	.....	12
.....	.....	30	.....	103,200	.....	.....	154,657	109	55,216	.....	13
2	11	194	.....	2,813,500	1,921,755	112,786	411,484	1,534	737,711	592,956	14
1	6	106	.....	2,373,750	1,802,505	98,386	192,112	1,213	577,349	304,956	15
1	3	55	.....	270,200	119,250	.....	191,031	250	129,216	.....	16
.....	.....	5	.....	12,350	.....	14,400	.....	13	5,250	288,000	17
.....	2	21	.....	111,700	.....	.....	.....	25	6,942	.....	18
.....	.....	7	.....	45,500	.....	.....	28,341	33	18,954	.....	19
19	405	474	7	106,473,369	42,645,226	4,456,425	3,154,905	16,241	8,992,737	12,141,171	20
16	365	233	7	100,991,390	42,443,266	4,043,331	915,893	14,462	7,856,896	4,428,505	21
3	23	199	.....	1,880,847	165,314	.....	1,574,429	1,032	756,956	.....	22
.....	14	16	.....	3,346,782	.....	413,094	462,382	603	290,533	7,712,666	23
.....	.....	6	.....	13,600	.....	.....	50	6	2,016	.....	24
.....	3	20	.....	240,750	36,646	.....	202,151	138	86,336	.....	25
.....	11	17	.....	1,032,393	20,870	650	7,613	237	232,810	13,000	26
.....	.....	2	.....	22,500	20,870	.....	2,436	12	10,872	.....	27
.....	2	2	.....	39,000	.....	.....	1,155	18	12,152	.....	28
.....	.....	1	.....	3,600	.....	650	.....	3	600	13,000	29
.....	.....	3	.....	3,000	.....	.....	22	4	424	.....	30
.....	9	9	.....	964,293	.....	.....	4,000	200	208,762	.....	31
1	34	494	2	7,135,271	4,317,542	.....	23,632	2,258	962,542	.....	32
.....	33	370	.....	6,924,071	4,317,542	.....	19,960	2,161	940,174	.....	33
1	1	118	2	204,850	.....	.....	72	84	20,143	.....	34
.....	.....	6	.....	6,350	.....	.....	3,600	13	2,225	.....	35
1	1	299	.....	1,136,260	1,192,747	.....	11,763	863	332,516	.....	36
.....	.....	199	.....	967,510	1,192,747	.....	9,291	783	313,583	.....	37
1	1	95	.....	164,400	.....	.....	72	72	17,508	.....	38
.....	.....	5	.....	4,350	.....	.....	2,400	8	1,425	.....	39
.....	.....	113	2	471,361	875,402	.....	8,800	514	224,343	.....	40
.....	.....	90	.....	430,411	875,402	.....	7,600	498	221,208	.....	41
.....	.....	22	2	38,950	.....	.....	.....	11	2,335	.....	42
.....	.....	1	.....	2,000	.....	.....	1,200	5	800	.....	43
.....	33	79	.....	5,517,150	2,229,840	.....	3,069	872	399,500	.....	44
.....	33	79	.....	5,517,150	2,229,840	.....	3,069	872	399,500	.....	45
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	46
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47
.....	.....	3	.....	10,500	19,553	.....	.....	9	6,183	.....	48
.....	.....	2	.....	9,000	19,553	.....	.....	8	5,883	.....	49
.....	.....	1	.....	1,500	.....	.....	.....	1	300	.....	50
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51
.....	48	725	10	6,686,557	531,567	.....	4,061,734	2,143	1,138,292	.....	52
.....	.....	6	.....	13,800	6,500	.....	1,290	15	2,801	.....	53
.....	48	719	10	6,672,757	525,067	.....	4,060,444	2,128	1,135,491	.....	54
.....	1	136	1	554,660	25,730	.....	332,216	206	93,802	.....	55
.....	.....	2	.....	4,000	.....	.....	900	2	221	.....	56
.....	1	134	1	550,660	25,730	.....	331,316	204	93,581	.....	57
.....	4	103	.....	740,675	98,899	.....	623,366	338	169,922	.....	58
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59
.....	4	103	.....	740,675	98,899	.....	623,366	338	169,922	.....	60
.....	43	467	9	5,320,422	406,938	.....	3,106,002	1,559	846,737	.....	61
.....	.....	4	.....	9,800	6,500	.....	390	13	2,580	.....	62
.....	43	463	9	5,310,622	400,438	.....	3,105,612	1,546	844,157	.....	63
.....	.....	19	.....	70,800	.....	.....	150	40	27,831	.....	64
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65
.....	.....	19	.....	70,800	.....	.....	150	40	27,831	.....	66

MISSISSIPPI RIVER AND ITS TRIBUTARIES

MISSISSIPPI RIVER AND ITS TRIBUTARIES.

By STORY B. LADD.

The statistics of water transportation presented in this section are for the vessels operating on the Mississippi river and its tributaries. In accordance with the plan adopted at the Eleventh Census the rivers have been grouped under three heads, namely, the Upper Mississippi system, the Lower Mississippi system, and the Ohio system. St. Louis has been considered the point of separation between the Upper and the Lower Mississippi systems. The statistics of freight are shown for the leading ports and for the chief tributaries. At the Eleventh Census credit was given to every stream for such business as had its origin thereon, whether the finality of the operation was on that or some other stream. At the present census credit has been given to each stream for the freight shipped from ports or landings thereon, and in addition there are shown the freight deliveries by streams. This course has been adopted to avoid duplication of freight movement, although it is open to criticism that it does not show the total freight tonnage moved on certain rivers. For example, the Ohio river does not receive credit for freight shipped from St. Louis to ports on the Cumberland or the Tennessee rivers, nor for coal shipped from the Monongahela river to points on the lower Mississippi. It is, however, only in cases where a river serves as a highway and both the port of shipment and the port of delivery are on other streams that the plan fails to credit the river with all freight moved thereon.

The statistics with respect to ocean trade to and from New Orleans, for all boats operating below New Orleans or from New Orleans seaward, and for all boats operating on Lake Pontchartrain and its tributaries and on Grand Lake and the Gulf outlets to the bayous and rivers of lower Louisiana, have been included in the section on the Atlantic coast and Gulf of Mexico. All local traffic at New Orleans and all traffic on the bayous of Louisiana tributary to the Mississippi are included in this section of the report.

The water traffic for St. Louis has been credited to the Upper or to the Lower Mississippi system according as the freight was received from or shipped to ports above or below St. Louis, the local business of that port being credited to the Lower Mississippi. Likewise in the case of shipments from or to Cairo, Ill., the Ohio system has received credit for all freight that pertains to the Ohio river or any of its tributaries, while all Mississippi river freight has been credited to the Lower Mississippi system.

Separate statistics are given for all rivers for which reports were received for boats of 5 tons net register or over owned by three or more proprietors, whether individuals, firms, or corporations. The statistics for streams representing the operations of less than three proprietors can not be shown without disclosing the business of individual operations. The traffic reported for a specific stream includes the traffic on all branches thereof unless an exception is specifically noted. Thus the totals shown for the Tennessee river include data for all traffic on the French Broad, the Hiwassee, etc.; likewise freight on the Barren is included with that for the Green.

The Red River (of the North) was at the Eleventh Census included with the Mississippi river and its tributaries, under the group title, "rivers of the Mississippi valley." At the present census the statistics for the Red River (of the North) will be found in the section on canals and other inland waters.

COMPARISON WITH PRIOR CENSUSES.

The methods followed in the presentation of the statistics compiled at the Tenth and Eleventh censuses differ in so many particulars from the methods adopted for the present census that comparisons only of the most general character can be made.

The census of 1880 was for the steam navigation of the United States, and took cognizance, primarily, of steam craft and of freight carried on steam vessels, and incidentally, in the case of the Mississippi River traffic, of freight carried by the barge lines of St. Louis and by the coal barges of Pittsburg. No compilation of the statistics for unrigged craft in general was made.

In 1890 a comprehensive census of all craft was taken for the year 1889, both steam and unrigged, and the boats and their traffic were assigned to the river upon which they plied or on which the freight origi-

nated. In many cases boats ply upon several streams, for example, upon the Mississippi, the Ohio, and the Tennessee, or upon the Illinois and the Mississippi; and hence, as the data could not be apportioned, they have been assigned, where distribution has been attempted, to the river on which the boat's chief or home port is located or the port from which the bulk of its freight emanated.

The Mississippi river with its tributaries, comprising about 16,000 miles of river navigation or waters susceptible of navigation, constituted in the earlier days the commercial highway for half of the Republic. It is Nature's route to the seaboard for a territory extending from St. Paul to New Orleans, and from Pittsburg in the east to the headwaters of the Missouri in the west, a territory measured by 15 degrees of latitude and over 30 degrees of longitude. About one-half of the total number of states and territories are touched by its waters.

The general statistics for 1889 and 1906, with the per cent of increase or decrease for the several items, are shown in Table 1.

TABLE 1.—ALL VESSELS AND CRAFT: 1906 AND 1889.

[Vessels operating as connecting links in railroad systems did not uniformly report the tonnage of freight carried or income for the year. In addition to the craft reported in this table there were 171 vessels, with a gross tonnage of 15,038, reported as idle in 1906, and 138, with a gross tonnage of 17,364, reported as idle or untraceable in 1889.]

	TOTAL.			STEAM.[1]			UNRIGGED.		
	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels	9,622	7,300	31.8	1,435	972	47.6	8,187	6,328	29.4
Gross tonnage	4,411,967	3,364,610	31.1	146,227	192,974	[2]24.2	4,265,740	3,171,636	34.5
Value of vessels	$22,852,142	$14,407,162	58.6	$13,196,770	$9,622,608	37.1	$9,655,372	$4,784,554	101.8
Gross income	$17,342,038	$16,331,872	6.2	$15,410,136	([3])	.....	$1,931,902	([3])	.....
Number of employees	15,016	15,951	[2]5.9	13,973	([3])	.....	1,043	([3])	.....
Wages	$5,692,117	$5,337,185	6.7	$5,148,581	([3])	.....	$543,536	([3])	.....
Number of passengers carried	14,122,241	10,858,894	30.1	13,890,850	([3])	.....	231,391	([3])	.....
Freight carried, including harbor work (net tons)	27,856,641	29,401,409	[2]5.3	4,551,014	10,345,504	[2]56.0	23,305,627	19,055,905	22.3

[1] Includes all craft propelled by machinery. [2] Decrease. [3] Not reported separately.

In addition to the vessels and craft included in this and other tables, 14 steamers or power boats of 653 gross tons were in service on the waters of the Upper Mississippi system. These boats were reported too late for tabulation and, moreover, no detailed statistics concerning them were furnished.

There was a material increase in the number of vessels of each class, but all the increase in tonnage was in unrigged vessels, the power vessels showing a large decrease. The fact that there was an increase in the number and at the same time a decrease in the tonnage of steam or power vessels, is due to the greatly increased number of small boats. This change is reflected in the quantity of freight handled, the amount carried by steam vessels in 1906, exclusive of harbor work, being about one-fourth of the amount carried in 1889. The decrease in the amount of barge freight along with an increase in the number and tonnage of the unrigged vessels will be noted, due apparently to the use of a relatively larger number of coal barges that make but a single trip. The coal traffic down the Ohio and the Mississippi is the chief freight factor on these rivers, and it is handled in the main by a comparatively few barge owners and shippers. A large number of coal boats are built to be used but once and sold for rough lumber on their arrival at lower river ports. This practice makes unnecessary the long tow back of empty barges that would otherwise result, since there is no adequate return freight. With the growing scarcity of lumber this plan of building coal flats for use for a single trip will probably be abandoned. Steel barges, some of which are now in use, besides being stronger than wooden barges, carry about 20 per cent more cargo on the same draft of water. In 1889 the barge freight was over six times as much as the barge tonnage, whereas in 1906 it was about four times as great, not including harbor work.

Tables 2 and 3 give the general statistics for the census of 1880 as presented in the comparative tables of the report for the census of 1889, and require no special comment.

TABLE 2.—*Water transportation on the rivers of the Mississippi valley: 1880.*[1]

	Total.	Steam.	Unrigged.
Number of vessels	5,052	1,198	3,854
Gross tonnage	1,161,617	251,793	909,824
Value of vessels	$16,379,400	$12,009,400	$4,370,000
Gross income	$20,293,173	([2])	([2])
Number of employees (ordinary crews)	23,616	([2])	([2])
Wages	$6,979,226	([2])	([2])
Number of passengers carried	6,728,067	([2])	([2])
Freight moved (net tons)	18,946,522	13,557,884	5,388,638

[1] From report on Transportation on the Rivers of the Mississippi Valley for the Eleventh Census, pages 448 and 449.
[2] Not reported separately.

TABLE 3.—*Steam vessels on the rivers of the Mississippi valley, by occupation: 1880.*[1]

OCCUPATION.	Number of vessels.	Gross tonnage.	Value.
Total	1,198	251,793	$12,009,400
Passenger and freight vessels	503	166,376	7,059,900
Ferryboats	177	21,307	1,022,900
Towing and harbor vessels	477	63,225	3,800,500
Miscellaneous	41	885	126,100

[1] From report on Transportation on the Rivers of the Mississippi Valley for the Eleventh Census, pages 448 and 449.

A comparison of the several tables compiled from the reports of the Commissioner of Navigation with the returns of the Census Office shows differences in the number of boats and in the tonnage. These differences are due in part to the fact that the Census statistics are for the calendar year and include all boats of 5 tons measurement, whether documented or undocumented, while the returns of the Commissioner of Navigation are for the fiscal year ending June 30 and are for documented boats only, and, further, to the fact that boats are carried on the documented rolls until it is shown that they have been abandoned.

The large number of small undocumented boats, particularly gasoline boats, results in making the total number of power boats returned by the Census exceed the number of boats reported by the Commissioner of Navigation, while the tonnage of a few large boats that have been abandoned but are still carried on the documented rolls operates as an offset to the tonnage of a large number of small undocumented craft.

It is probable, moreover, that in many cases differences will appear when the freight statistics herein given are compared with similar statistics shown in the reports of the Chief of Engineers, United States Army, for specific rivers or ports, or in the reports of the various commercial organizations of the cities of the Mississippi valley. Such differences are due, as a rule, to the lack of uniformity either in the time or in the scope of the statistics compared, or in the manner of presenting the data.

The total documented shipping of the Mississippi system on June 30, 1906, which includes documented steam and unrigged vessels, was 167,957 gross tons, compared with a total of 274,527 tons on June 30, 1896, a decrease of 38.8 per cent for the ten-year period. This decadence is in striking contrast with an increase in each of the other districts; the American documented shipping for the Atlantic coast and Gulf of Mexico increased 28.5 per cent during the decade; that for the Great Lakes, 70.1 per cent; and that for the Pacific coast, 86.7 per cent.[1]

The following statement gives, for the Mississippi River district, the number and gross tonnage of the documented vessels which could not be found and for which no reports were received in 1906:

Documented vessels for which no reports were received: 1906.

CLASS.	Number of vessels.	Gross tonnage.
Total	43	1,664
Steam	38	1,361
Unrigged	5	303

Growth of steam navigation.—A presentation of the number and tonnage of the Mississippi fleet of documented steam vessels for a series of years will help to show the rise and decline of steamboat navigation on the Mississippi.

Table 4 shows the number and tonnage of all documented steam vessels built on the Mississippi river and its tributaries for quinquennial groups of years from 1811 to 1906.

TABLE 4.—*Documented steam vessels built, by quinquennial periods: 1811 to 1906.*[1]

PERIOD.	TOTAL.		Average tonnage per vessel.	AVERAGE PER YEAR.	
	Number of vessels.	Gross tonnage.		Number of vessels.	Gross tonnage.
1906	144	4,586	32	144.0	4,586.0
1901 to 1905	728	42,592	59	145.6	8,518.4
1896 to 1900	480	59,184	123	96.0	11,836.8
1891 to 1895	392	51,864	132	78.4	10,372.8
1886 to 1890	369	54,663	148	73.8	10,936.6
1881 to 1885	551	97,577	177	110.2	19,515.4
1876 to 1880	596	124,275	209	119.2	24,855.0
1871 to 1875	588	128,054	218	117.6	25,610.8
1866 to 1870	504	142,578	283	100.8	28,515.6
1861 to 1865	706	153,573	218	141.2	30,714.6
1856 to 1860	675	147,465	218	135.0	29,493.0
1851 to 1855	671	160,157	239	134.2	32,031.4
1846 to 1850	638	124,534	195	127.6	24,906.8
1841 to 1845	495	87,552	177	99.0	17,510.4
1836 to 1840	459	72,284	157	91.8	14,456.8
1831 to 1835	270	35,720	132	54.0	7,144.0
1826 to 1830	156	27,225	175	31.2	5,445.0
1821 to 1825	69	10,075	146	13.8	2,015.0
1816 to 1820	62	12,620	204	12.4	2,524.0
1811 to 1815	9	1,589	177	1.8	317.8

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor, for 1884 and subsequent years; from "Commerce and Navigation of the United States," Treasury Department, for 1881 to 1883, inclusive; and from the report on Transportation, Tenth Census of the United States, for years preceding 1881.

The first steamboat on the Mississippi was the *New Orleans*, a side wheeler, launched at Pittsburg in 1811.[2] It arrived at New Orleans, January 10, 1812, and was put in service between New Orleans and Natchez. The first towboat on the Mississippi river was put in service at New Orleans in November, 1815, and was used for towing vessels up to the city from the mouth of the river.

The second steamboat was built in 1813 and had a tonnage of 25; 2 with an aggregate tonnage of 386 were built in 1814; and 5 with a total tonnage of 1,078 were built in 1815. The steamer *Washington* made a memorable ascent of the Mississippi in 1817 and removed all doubts as to the practicability of steam navigation against the river currents, and from that time the business of steamboat building advanced rapidly. The period 1851 to 1860 marks the crest of steamboat building. Prior thereto the number of new boats increased year by year and there was a general increase in the tonnage; although a large number of new boats were built during the period 1861 to 1865 and the tonnage was large, yet from that time on the new yearly tonnage shows a striking decrease for almost every period. In the year 1871 there were 155 new boats, with an aggregate tonnage of 50,084, the largest tonnage for any one year, but the tonnage for preceding and following years was low. In 1864,

[1] Report of Commissioner of Navigation.

[2] J. H. Morrison. History of American Steam Navigation, page 90 ff.

1865, and 1866 steamboat building was active and the new tonnage in 1865 was 50,082 tons, next in amount to that of 1871, but the average tonnage per year for the five-year period of 1861 to 1865 was less than that for the period from 1851 to 1855, and the annual average for 1866 to 1870 was still lower, while the years immediately preceding the financial crisis of 1857 all showed large tonnage. The tonnage in 1906 is less than that for any year since 1831. The development of the gasoline power boat in the later years is responsible in part for the decline in the documented tonnage, and particularly so for the marked decrease in the average tonnage per vessel.

Table 5 gives the number and gross tonnage of the documented steam vessels, classified according to tonnage groups, for the years 1889 to 1906.

TABLE 5.—NUMBER AND GROSS TONNAGE OF DOCUMENTED STEAM VESSELS, BY TONNAGE GROUPS: 1889 TO 1906.[1]

YEAR.	TOTAL.		5 TO 49 TONS.		50 TO 99 TONS.		100 TO 499 TONS.		500 TO 999 TONS.		1,000 TONS AND OVER.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	1,451	152,592	754	14,057	300	22,508	339	72,289	51	33,784	7	9,954
1905	1,405	159,772	676	13,244	323	24,128	340	72,238	58	38,599	8	11,563
1904	1,342	165,877	596	12,187	326	24,385	349	74,477	62	41,257	9	13,571
1903	1,241	166,949	505	10,839	311	23,132	350	74,748	65	43,045	10	15,185
1902	1,193	166,574	450	10,429	314	23,498	356	76,812	65	43,208	8	12,627
1901	1,144	167,619	404	9,813	303	22,656	361	78,052	67	44,346	9	12,752
1900	1,101	168,406	369	9,290	285	21,259	370	78,926	67	44,171	10	14,760
1899	1,064	169,519	337	8,936	271	20,190	380	80,571	64	42,441	12	17,381
1898	1,064	167,297	335	9,103	274	20,405	380	80,729	66	43,947	9	13,113
1897	1,048	175,075	298	9,912	279	19,320	393	84,615	66	43,863	12	17,365
1896	1,047	176,344	292	8,413	274	20,399	405	86,696	63	41,940	13	18,896
1895	1,061	184,443	290	8,376	269	19,900	420	90,243	67	44,615	15	21,309
1894	1,087	191,142	294	8,344	279	20,637	426	90,742	71	47,763	17	23,656
1893	1,123	201,300	285	8,167	289	21,436	456	97,554	75	50,710	18	23,433
1892	1,122	207,001	270	7,815	285	20,988	470	100,263	76	51,156	21	26,779
1891	1,111	205,708	277	8,007	267	19,815	472	100,761	74	50,419	21	26,706
1890	1,087	205,277	261	7,494	258	18,981	475	101,336	71	48,878	22	28,588
1889	1,114	209,826	270	7,933	261	19,345	493	103,358	67	49,026	23	30,164

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.

The tonnage of all steam vessels shows a practically steady decrease—amounting, from 1889 to 1906, to 27.3 per cent. In certain years as compared with the preceding years a slight increase is apparent, but on the whole the shrinkage is quite uniform. The number of vessels varied within narrow limits from 1889 to 1899, but from the latter date the number increased from year to year. The increase in number is, however, in small boats, chiefly in the 5 to 49 ton class. The number of boats in this class increased 179.3 per cent, and the tonnage thereof increased 77.2 per cent, between 1889 and 1906. Vessels of the 50 to 99 ton class increased 14.9 per cent in number and 16.4 per cent in tonnage. The higher classes, on the other hand, show decreases. Boats of the 100 to 499 ton class decreased 31.2 per cent in number and 30.1 per cent in tonnage; boats of the 500 to 999 ton class decreased 23.9 per cent in number and 31.2 per cent in tonnage; and boats of 1,000 tons and over decreased 69.6 per cent in number and 67 per cent in tonnage.

For 1898 and the years prior thereto the reports of the Commissioner of Navigation give a segregation of steam vessels of a tonnage from 100 to 499 tons, in groups of a hundred, and they show that the lower groups thereof contain the larger number of boats and the bulk of the tonnage. The following tabular statement shows the distribution of such boats by groups of a hundred, for the years 1889 and 1898, and the percentage of decrease for each group:

Documented steam vessels of 100 to 499 tons, by tonnage groups: 1889 to 1898.

GROUP.	NUMBER OF VESSELS.			GROSS TONNAGE.		
	1898	1889	Per cent of decrease.	1898	1889	Per cent of decrease.
Total	380	493	22.9	80,729	103,358	21.9
100 to 199 tons	222	295	24.7	32,180	42,601	24.5
200 to 299 tons	85	92	7.6	20,990	22,747	7.7
300 to 399 tons	51	80	36.3	17,591	25,481	31.0
400 to 499 tons	22	26	15.4	9,968	12,529	20.4

The change in the size of boats is further illustrated by Table 6, which gives, for each year from 1889 to 1906, the percentage of the total number of boats and the total tonnage in each tonnage class.

TABLE 6.—PER CENT DISTRIBUTION OF NUMBER AND GROSS TONNAGE OF DOCUMENTED STEAM VESSELS, BY TONNAGE GROUPS: 1889 TO 1906.[1]

YEAR.	5 TO 49 TONS.		50 TO 99 TONS.		100 TO 499 TONS.		500 TO 999 TONS.		1,000 TONS AND OVER.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	52.0	9.2	20.7	14.7	23.4	47.4	3.5	22.1	0.5	6.5
1905	48.1	8.3	23.0	15.1	24.2	45.2	4.1	24.2	0.6	7.2
1904	44.4	7.3	24.3	14.7	26.0	44.9	4.6	24.9	0.7	8.2
1903	40.7	6.5	25.1	13.9	28.2	44.8	5.2	25.8	0.8	9.1
1902	37.7	6.3	26.3	14.1	29.8	46.1	5.4	25.9	0.7	7.6
1901	35.3	5.9	26.5	13.5	31.6	46.6	5.9	26.5	0.8	7.6
1900	33.5	5.5	25.9	12.6	33.6	46.9	6.1	26.2	0.9	8.8
1899	31.7	5.3	25.5	11.9	35.7	47.5	6.0	25.0	1.1	10.3
1898	31.5	5.4	25.8	12.2	35.7	48.3	6.2	26.3	0.8	7.8
1897	28.5	5.6	26.6	11.0	37.5	48.3	6.3	25.1	1.1	9.9
1896	27.9	4.8	26.2	11.6	38.7	49.2	6.0	23.8	1.2	10.7
1895	27.3	4.5	25.4	10.8	39.6	48.9	6.3	24.2	1.4	11.6
1894	27.0	4.4	25.7	10.8	39.2	47.5	6.5	25.0	1.6	12.4
1893	25.4	4.1	25.7	10.6	40.6	48.5	6.7	25.2	1.6	11.6
1892	24.0	3.8	25.4	10.2	41.8	48.4	6.8	24.7	1.9	12.9
1891	24.9	3.9	24.0	9.6	42.5	49.0	6.7	24.5	1.9	13.0
1890	24.0	3.7	23.7	9.2	43.7	49.4	6.5	23.8	2.0	13.9
1889	24.2	3.8	23.4	9.2	44.3	49.3	6.0	23.4	2.1	14.4

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.

A marked increase is shown in the percentage that the number of boats with a tonnage of from 5 to 49 forms of the total number of vessels. The percentage for the number of boats with a tonnage of from 50 to 99 shows an increase, with fluctuations, followed by a decrease; while the percentages for number of boats in the groups with higher tonnage show decided decreases. The changes in tonnage percentages are not so great as those for the number of boats. In 1889 boats of from 5 to 99 tons constituted 47.7 per cent of all boats in number and 13 per cent in tonnage; in 1900 they constituted 59.4 per cent of the total number and 18.1 per cent of the tonnage; and in 1906 they formed 72.7 per cent of the total number and 23.9 per cent of the tonnage.

The change in steamboat equipment is further illustrated by Table 7.

TABLE 7.—NUMBER, GROSS TONNAGE, AND AVERAGE TONNAGE OF ALL DOCUMENTED STEAM VESSELS, AND OF SUCH VESSELS BUILT DURING EACH YEAR, WITH PER CENT NEW VESSELS ARE OF ALL VESSELS, AND NEW VESSELS, BY CHARACTER OF PROPULSION: 1880 TO 1906.[1]

YEAR.	ALL VESSELS.			VESSELS BUILT DURING THE YEAR.									AVERAGE TONNAGE PER VESSEL.	
				Total.		Side wheel.		Stern wheel.		Screw propeller.		Per cent of all vessels.			
	Number.	Gross tonnage.	Per cent of increase in tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	All vessels.	New vessels.
1906	1,451	152,592	[2]4.5	144	4,586	5	82	108	4,127	31	377	9.9	3.0	105	32
1905	1,405	159,772	[2]3.7	161	5,741	4	95	126	5,193	31	453	11.5	3.6	114	36
1904	1,342	165,877	[2]0.6	176	9,439	6	1,242	131	7,399	39	798	13.1	5.7	124	54
1903	1,241	166,949	0.2	137	9,597	13	2,183	99	7,004	25	410	11.0	5.7	135	70
1902	1,193	166,674	[2]0.6	139	8,888	8	176	99	7,834	32	878	11.7	5.3	140	64
1901	1,144	167,619	[2]0.5	115	8,927	6	858	97	7,348	12	721	10.1	5.3	147	78
1900	1,101	168,406	[2]0.7	109	8,823	8	1,662	86	6,888	15	273	9.9	5.2	153	81
1899	1,064	169,519	1.3	92	14,042	6	2,728	80	10,899	6	415	8.6	8.3	159	153
1898	1,064	167,297	[2]4.4	106	12,211	10	2,330	87	9,699	9	182	10.0	7.3	157	115
1897	1,048	175,075	[2]0.7	91	10,974	7	803	71	9,587	13	584	8.7	6.3	167	121
1896	1,047	176,344	[2]4.4	82	13,134	6	2,868	62	9,852	14	414	7.8	7.4	168	160
1895	1,061	184,443	[2]3.5	60	7,240	3	658	49	6,321	8	261	5.7	3.9	174	121
1894	1,087	191,142	[2]5.0	61	7,305	6	1,900	44	5,204	11	192	5.6	3.8	176	120
1893	1,123	201,300	[2]2.8	87	9,364	4	827	73	8,201	10	336	7.7	4.6	179	108
1892	1,122	207,001	0.6	89	12,482	8	1,595	72	10,571	9	316	7.9	6.0	184	140
1891	1,111	205,708	0.2	95	15,473	9	445	78	14,627	8	401	8.6	7.5	185	163
1890	1,087	205,277	[2]2.2	82	11,886	9	3,882	61	7,745	12	259	7.5	5.8	189	145
1889	1,114	209,826	[2]2.0	74	11,557	2	981	56	9,289	16	1,287	6.6	5.5	188	156
1888	1,122	214,036	[2]1.8	74	11,372	9	4,313	59	6,831	6	228	6.6	5.3	191	154
1887	1,144	217,942	[2]1.4	69	10,168	6	2,171	55	7,872	8	125	6.0	4.7	191	147
1886	1,105	221,089	[2]4.6	70	9,700	8	1,333	58	8,227	4	140	6.3	4.4	200	139
1885	1,145	231,676	[2]3.9	81	11,220	6	4,342	65	6,138	10	740	7.1	4.8	202	139
1884	1,157	241,007	[2]0.9	91	16,219	12	3,786	70	12,076	9	357	7.9	6.7	208	178
1883	1,163	243,317	[2]2.4	116	20,879	18	6,388	76	12,890	22	1,601	10.0	8.6	209	180
1882	1,226	249,210	0.9	134	24,672	12	6,576	100	17,124	22	972	10.9	9.9	203	184
1881	1,191	246,997	[2]3.9	129	24,587	24	6,926	82	15,436	23	2,225	10.8	10.0	207	190
1880	1,225	256,916	.....	117	23,931	30	11,450	75	11,791	12	690	9.6	9.3	210	205

[1] From the reports of the Commissioner of Navigation, 1884 and subsequent years, and "Commerce and Navigation of the United States," Treasury Department, for years preceding 1884.
[2] Decrease.

The increase in the number of new vessels dating approximately from 1900, with a marked decrease in the average tonnage of the new boats, is due to the development and growing use of gasoline power boats.

The steady decrease, with but few exceptions, in total tonnage from year to year shows that the new boats have not made good the wear and tear of the fleet. The number of small boats built has caused an increase in the total number, but the average tonnage of the new boats has been below the average tonnage for the fleet in every year, the difference being especially great since 1899.

Table 8 shows the number and tonnage of the documented steam vessels built on the Mississippi river and its tributaries for each year from 1880 to 1906, by customs districts.

TABLE 8.—STEAM VESSELS BUILT AND DOCUMENTED, BY CUSTOMS DISTRICTS: 1880 TO 1906.[1]

YEAR.	TOTAL.		CINCINNATI, OHIO.		DUBUQUE, IOWA.		EVANSVILLE, IND.		LOUISVILLE, KY.		MEMPHIS, TENN.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	144	4,586	9	152	4	215	12	225	15	1,286	10	192
1905	161	5,741	10	297	3	230	14	184	22	1,262	8	190
1904	176	9,439	7	281	4	863	16	438	15	1,434	15	342
1903	137	9,597	5	106	6	2,678	10	156	9	1,884	10	251
1902	139	8,888	10	500	.....	.....	16	341	16	2,081	17	665
1901	115	8,927	12	622	1	10	13	547	14	2,313	5	185
1900	109	8,823	9	553	.....	.....	13	415	14	2,660	11	276
1899	92	14,042	8	828	3	1,715	10	618	14	4,032	5	450
1898	106	12,211	8	521	.....	.....	16	459	16	4,500	9	398
1897	91	10,974	8	884	2	177	6	246	13	4,584	17	1,369
1896	82	13,134	7	2,318	3	868	6	532	9	2,864	10	661
1895	60	7,240	3	232	2	113	4	529	10	2,457	7	613
1894	61	7,305	2	72	2	95	3	185	7	3,264	8	427
1893	87	9,364	7	431	1	66	10	1,027	12	2,343	10	702
1892	89	12,482	7	2,312	.....	.....	4	128	17	4,111	6	299
1891	95	15,473	14	1,379	4	1,102	6	853	16	5,723	9	624
1890	82	11,886	2	89	.....	.....	5	282	16	5,569	7	1,101
1889	74	11,557	8	1,083	4	671	2	92	14	4,392	7	1,102
1888	74	11,372	4	315	2	238	5	186	12	4,351	8	1,371
1887	69	10,168	4	502	.....	.....	5	635	14	4,241	9	611
1886	70	9,700	4	718	2	260	1	235	11	2,270	8	818
1885	81	11,220	10	2,376	3	196	5	282	15	4,273	5	381
1884	91	16,219	6	1,009	1	27	6	539	15	6,106	4	522
1883	116	20,879	14	2,852	2	231	8	372	18	7,947	10	582
1882	134	24,672	18	3,064	1	192	6	337	18	8,430	6	250
1881	129	24,587	17	4,210	2	366	4	346	21	7,465	8	945
1880	117	23,931	18	6,484	1	457	8	356	17	5,302	5	435

YEAR.	NEW ORLEANS, LA.		PITTSBURG, PA.		ROCK ISLAND, ILL.		ST. LOUIS, MO.		WHEELING, W. VA.		ALL OTHER DISTRICTS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
1906	13	415	1	151	19	367	4	107	13	559	44	917
1905	26	564	.....	.....	20	317	3	85	13	702	42	1,910
1904	18	700	9	1,621	16	610	5	128	24	1,463	47	1,559
1903	6	262	8	1,277	30	585	4	216	14	541	35	1,641
1902	9	651	9	836	20	563	3	207	18	989	21	2,055
1901	13	544	7	611	8	477	8	1,018	14	1,509	20	1,091
1900	7	654	8	1,630	5	205	2	25	12	1,285	28	1,120
1899	8	415	8	1,655	3	38	4	281	9	2,294	20	1,716
1898	8	538	4	770	4	419	11	1,879	10	1,094	20	1,633
1897	1	99	2	782	5	229	9	245	9	1,045	19	1,314
1896	6	183	3	1,263	7	733	3	1,057	4	705	24	1,950
1895	7	361	6	1,058	3	209	1	34	6	818	11	816
1894	4	108	6	962	3	206	3	118	6	646	17	1,222
1893	5	364	9	927	4	398	1	41	13	1,665	15	1,400
1892	6	336	7	999	4	432	4	137	10	1,865	24	1,863
1891	5	318	4	573	6	400	3	785	17	2,651	11	1,065
1890	5	156	6	728	.....	.....	6	313	13	1,714	22	1,934
1889	3	1,080	8	881	.....	.....	1	43	6	493	21	1,720
1888	6	392	6	1,468	.....	.....	.....	.....	12	1,065	19	1,986
1887	4	89	10	2,248	.....	.....	4	70	6	504	13	1,268
1886	2	96	12	2,886	.....	.....	2	87	8	724	20	1,606
1885	8	368	4	843	.....	.....	7	776	13	1,237	11	488
1884	6	504	18	4,392	.....	.....	5	466	13	1,332	17	1,322
1883	8	482	6	3,040	.....	.....	6	1,344	22	2,085	22	1,944
1882	7	337	27	6,424	.....	.....	11	1,440	18	1,981	22	2,217
1881	6	1,253	24	4,428	.....	.....	13	2,254	15	2,057	19	1,263
1880	7	448	10	4,330	.....	.....	18	2,024	12	1,084	21	3,011

[1] From the reports of the Commissioner of Navigation, 1884 and subsequent years, and "Commerce and Navigation of the United States," Treasury Department, for years preceding 1884.

Nearly one-third of the entire tonnage shown in the table is credited to the Louisville district. The table discloses certain marked changes in the boat building centers during the quarter of a century it covers. The following statement shows the number of boats built during the periods 1880 to 1885 and 1901 to 1906, the

total tonnage of such boats for the several districts, and the rank of the districts according to tonnage for the respective periods:

New steam vessels, by customs districts: 1880 to 1885 and 1901 to 1906.

CUSTOMS DISTRICT.	1880 TO 1885.		CUSTOMS DISTRICT.	1901 TO 1906.	
	Number of vessels.	Gross tonnage.		Number of vessels.	Gross tonnage.
Louisville, Ky	104	39,523	Louisville, Ky	91	10,260
Pittsburg, Pa	89	23,457	Wheeling, W. Va	96	5,763
Cincinnati, Ohio	83	19,995	Pittsburg, Pa	34	4,496
Wheeling, W. Va	93	9,776	Dubuque, Iowa	18	3,996
St. Louis, Mo	60	8,304	New Orleans, La	85	3,136
New Orleans, La	42	3,392	Rock Island, Ill	113	2,919
Memphis, Tenn	38	3,115	Cincinnati, Ohio	53	1,958
Evansville, Ind	37	2,232	Evansville, Ind	81	1,891
Dubuque, Iowa	10	1,469	Memphis, Tenn	65	1,825
Rock Island, Ill			St. Louis, Mo	27	1,761

The advance in relative rank of the Rock Island and Dubuque districts and the decline of Cincinnati and St. Louis are noticeable. Important districts included under "all other districts" in Table 8 are Chattanooga, Tenn., which is credited for the period 1880 to 1906 with 94 boats of 7,839 tonnage; Paducah, Ky., with 63 boats of 4,595 tonnage; Cairo, Ill., with 31 boats of 3,460 tonnage; Nashville, Tenn., with 49 boats of 3,417 tonnage; Burlington, Iowa, with 53 boats of 2,804 tonnage; and Vicksburg, Miss., with 29 boats of 1,100 tonnage.

Table 9 shows, for comparative purposes, the number, gross tonnage, and average tonnage per vessel of all documented steamers, by customs districts, for the years 1889, 1895, 1900, and 1906, covering approximately five-year intervals.

TABLE 9.—DOCUMENTED STEAM VESSELS, BY CUSTOMS DISTRICTS, ARRANGED BY SYSTEMS: 1906, 1900, 1895, AND 1889.[1]

CUSTOMS DISTRICT.	1906			1900			1895			1889		
	Number of vessels.	Gross tonnage.	Average tonnage.	Number of vessels.	Gross tonnage.	Average tonnage.	Number of vessels.	Gross tonnage.	Average tonnage.	Number of vessels.	Gross tonnage.	Average tonnage.
Aggregate	1,451	152,592	105	1,101	168,406	153	1,061	184,443	174	1,114	209,826	188
Upper Mississippi system	293	14,386	49	197	19,185	97	187	20,555	110	226	27,093	120
Burlington, Iowa	44	1,691	38	20	1,533	77	28	3,312	118	43	5,059	118
Dubuque, Iowa	15	385	26	12	3,858	322	18	4,239	236	28	6,355	227
Galena, Ill	4	102	26	3	112	37	1	65	65	27	3,130	116
La Crosse, Wis	21	1,271	61	41	3,555	87	41	3,624	88	47	3,884	83
Minnesota	34	1,767	52	29	1,549	53	19	1,546	81	46	5,214	113
Peoria, Ill	12	489	41	11	431	39	9	458	51	.....	.....	.....
Rock Island, Ill	100	4,717	47	46	4,079	89	45	5,031	112	.....	.....	.....
Missouri river—												
Kansas City, Mo	16	883	55	10	652	65	7	513	73	16	1,780	111
St. Joseph, Mo	4	138	35	1	27	27	2	44	22	6	341	57
Omaha, Nebr	1	16	16	14	1,269	91	12	1,162	97	13	1,330	102
North and South Dakota	8	470	59	4	555	139	2	349	175	.....	.....	.....
Montana and Idaho	7	1,035	148	6	1,565	261	3	212	71	.....	.....	.....
Sioux City, Iowa	27	1,422	53	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio system	711	85,624	120	546	82,629	151	527	91,509	174	542	105,075	194
Cincinnati, Ohio	102	14,835	145	88	16,827	191	107	23,083	216	115	31,407	273
Chattanooga, Tenn	44	2,161	49	23	1,568	68	27	4,307	160	22	3,966	180
Evansville, Ind	136	7,043	52	90	4,772	53	50	5,106	102	54	6,951	129
Louisville, Ky	62	6,388	103	42	7,338	175	37	6,932	187	52	11,938	230
Nashville, Tenn	30	3,244	108	19	2,173	114	17	1,888	111	.....	.....	.....
Paducah, Ky	44	4,291	98	44	6,696	152	31	6,407	207	53	8,781	166
Pittsburg, Pa	168	38,688	230	152	34,221	225	148	33,566	227	152	32,263	212
Wheeling, W. Va	125	8,974	72	88	9,034	103	110	10,220	93	94	9,769	104
Lower Mississippi system	447	52,582	118	358	66,592	186	347	72,379	209	346	77,658	224
Cairo, Ill	21	2,323	111	20	2,928	146	17	3,954	233	.....	.....	.....
Memphis, Tenn	126	10,921	87	90	12,180	135	69	9,025	131	71	12,117	171
Natchez, Miss	6	1,135	189	2	349	175	4	580	145	4	592	148
New Orleans, La	174	14,204	82	113	16,423	145	127	17,298	136	126	19,246	153
St. Louis, Mo	88	20,795	236	107	30,860	288	109	38,703	355	115	42,827	372
Vicksburg, Miss	32	3,204	100	26	3,852	148	21	2,819	134	30	2,876	96

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.

As a rule the documented tonnage decreased for the several districts, the principal exceptions being Natchez and Vicksburg, on the lower Mississippi, Nashville on the Cumberland, and Pittsburg and Evansville on the Ohio. The decrease in the average tonnage of the documented steam vessels is specially marked for Dubuque, St. Louis, Chattanooga, Cincinnati, and Louisville.

A natural grouping of the customs districts is presented in Table 10.

TABLE 10.—*Tonnage of documented steam vessels, by customs districts groups, with per cent of decrease: 1906 and 1889.*[1]

CUSTOMS DISTRICTS GROUP.	GROSS TONNAGE.		Per cent of decrease.
	1906	1889	
Total	152,592	209,826	27.3
Upper Mississippi, including Burlington, Dubuque, Galena, La Crosse, Minnesota, Peoria, and Rock Island	10,422	23,642	55.9
Missouri, including Kansas City, St. Joseph, Omaha, North and South Dakota, Montana and Idaho, and Sioux City	3,964	3,451	[2] 14.9
Central, including St. Louis, Cairo, and Paducah	27,409	51,608	46.9
Ohio, including Cincinnati, Chattanooga, Evansville, Louisville, Nashville, Pittsburg, and Wheeling	81,333	96,294	15.5
Lower Mississippi, including Memphis, Natchez, New Orleans, and Vicksburg	29,464	34,831	15.4

[1] From the reports of the Commissioner of Navigation, Department of Commerce and Labor.
[2] Increase.

The percentage of decrease in the documented steam vessel tonnage has been heaviest on the upper Mississippi (exclusive of the Missouri); next heaviest in the central district, comprising the middle Mississippi and the mouth of the Ohio; and least on the lower Mississippi, although the percentage for the Ohio is almost the same as that for the lower Mississippi. In the Missouri district alone there was an increase, but the actual amount of the tonnage is small.

CONSTRUCTION.

Statistics concerning the material of construction and the character of service or occupation of all vessels in service, as reported for 1906, are presented in Table 11.

TABLE 11.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CHARACTER OF CONSTRUCTION AND BY OCCUPATION, WITH AVERAGE TONNAGE PER VESSEL AND AVERAGE VALUE PER TON: 1906.

CLASS AND OCCUPATION.	TOTAL.			WOOD.			IRON.			STEEL.		
	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Aggregate	9,622	4,411,967	22,852,142	9,513	4,377,480	20,213,460	26	2,748	436,988	81	31,145	2,143,694
Steam	1,435	146,227	13,196,770	1,358	129,141	10,870,593	25	2,115	404,488	50	14,377	1,863,689
Freight and passenger	390	55,779	3,737,450	379	52,692	3,407,950	1	50	4,500	9	2,912	317,000
Tugs and other towing vessels	619	62,836	6,822,210	578	55,881	5,571,777	18	1,398	245,988	22	5,088	954,445
Ferryboats	166	22,180	1,776,360	153	15,604	1,156,616	3	517	85,000	10	6,059	534,744
Yachts	222	3,255	563,400	211	2,887	471,900	2	50	34,000	9	318	57,500
All other	38	2,177	297,350	37	2,077	262,350	1	100	35,000	.....	.....	.....
Unrigged	8,187	4,265,740	9,655,372	8,155	4,248,339	9,342,867	1	633	32,500	31	16,768	280,005

CLASS AND OCCUPATION.	COMPOSITE.			AVERAGE TONNAGE PER VESSEL.					AVERAGE VALUE PER TON.				
	Number of vessels.	Gross tonnage.	Value of vessels.	All vessels.	Wood.	Iron.	Steel.	Composite.	All vessels.	Wood.	Iron	Steel.	Composite.
Aggregate	2	594	58,000	459	460	106	385	297	$5	$5	$159	$69	$98
Steam	2	594	58,000	102	95	85	288	297	90	84	191	130	98
Freight and passenger	1	125	8,000	143	139	50	324	125	67	65	90	109	64
Tugs and other towing vessels	1	469	50,000	102	97	78	231	469	109	100	176	188	107
Ferryboats	.....	.....	.....	134	102	172	606	.....	80	74	164	88	.....
Yachts	.....	.....	.....	15	14	25	35	.....	173	163	680	181	.....
All other	.....	.....	.....	57	56	100	.....	.....	137	126	350	.....	.....
Unrigged	.....	.....	.....	521	521	633	541	.....	2	2	51	17	.....

The number of wooden vessels propelled by steam constituted 94.6 per cent of the total number of the steam vessels, and their tonnage formed 88.3 per cent of the steam tonnage. The tonnage of steel vessels constituted 9.8 per cent of the tonnage of all steam vessels, while the tonnage of vessels of iron and of composite construction constituted 1.4 per cent and four-tenths of 1 per cent, respectively. Of the tonnage of unrigged craft, but four-tenths of 1 per cent was for vessels of iron or steel construction and 99.6 per cent for those of wood.

For 1889 the character of construction was not reported, but on the assumption that all the vessels were of wood, a comparative presentation by character of construction is given in Table 12, for all boats in service as reported at the censuses of 1906 and 1889.

TABLE 12.—*Number, gross tonnage, and value of vessels, by character of construction, with per cent of increase: 1906 and 1889.*

	1906	1889	Per cent of increase.
Total:			
Number of vessels	9,622	7,300	31.8
Gross tonnage	4,411,967	3,364,610	31.1
Value of vessels	$22,852,142	$14,407,162	58.6
Wood:			
Number of vessels	9,513	7,300	30.3
Gross tonnage	4,377,480	3,364,610	30.1
Value of vessels	$20,213,460	$14,407,162	40.3
Iron, steel, and composite:			
Number of vessels	109	.....	.....
Gross tonnage	34,487	.....	.....
Value of vessels	$2,638,682	.....	.....

The 26 iron boats in use in 1906 had a gross tonnage of 2,748 and were valued at $436,988; the 81 steel boats had a gross tonnage of 31,145 and were valued at $2,143,694; and the 2 composite vessels had a gross tonnage of 594 and were valued at $58,000. The wood vessels comprised 99.2 per cent of the total when measured by gross tonnage.

CHARACTER OF PROPULSION.

Table 13 gives the number and gross tonnage of all power boats or vessels of the steam class, classified according to rig or means of propulsion.

TABLE 13.—NUMBER AND GROSS TONNAGE OF ALL POWER VESSELS, BY CHARACTER OF PROPULSION AND BY OCCUPATION: 1906.

OCCUPATION.	TOTAL.		STERN WHEEL.		SIDE WHEEL.		CENTER WHEEL.		SCREW.		PER CENT OF TOTAL.							
											Stern wheel.		Side wheel.		Center wheel.		Screw.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.
Total	1,435	146,227	990	108,405	85	28,372	4	616	356	8,834	69.0	74.1	5.9	19.4	0.3	0.4	24.8	6.0
Freight and passenger	390	55,779	287	39,447	36	15,280	.....	.....	67	1,052	73.6	70.7	9.2	27.4	.....	(1)	17.2	1.9
Tugs and other towing vessels	619	62,836	506	57,213	7	174	.....	.....	106	5,449	81.7	91.1	1.1	0.3	.....	.....	17.1	8.7
Ferryboats	166	22,180	105	8,257	35	12,598	4	616	22	709	63.3	37.2	21.1	56.8	2.4	2.8	13.3	3.2
Yachts	222	3,255	70	1,774	6	96	.....	.....	146	1,385	31.5	54.5	2.7	2.9	.....	.....	65.8	42.5
All other	38	2,177	22	1,714	1	224	.....	.....	15	239	57.9	78.7	2.6	10.3	.....	.....	39.5	11.0

(1) Less than one-tenth of 1 per cent.

The flat-bottomed stern wheeler is and has been the prevailing type of steamboat on the Mississippi. Boats of this class constituted in 1906 more than two-thirds of the total number of power boats and nearly three-fourths of the total tonnage of such vessels. The side wheelers were chiefly employed in freight and passenger and in ferry service, and the center wheelers are steam catamarans chiefly used in ferry service. Boats of the screw propeller class formed nearly one-fourth of the total number, but had only 6 per cent of the total tonnage.

CHARACTER OF POWER.

Table 14 gives the number, gross tonnage, and horsepower of all power vessels, classified according to character of power and according to occupation, or character of service.

TABLE 14.—NUMBER, GROSS TONNAGE, AND HORSEPOWER OF ALL POWER VESSELS, BY CHARACTER OF POWER AND BY OCCUPATION: 1906.

OCCUPATION.	TOTAL.			STEAM.			GASOLINE.			PER CENT.					
										Steam.			Gasoline.		
	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.	Number of vessels.	Gross tonnage.	Horsepower.	Number.	Gross tonnage.	Horsepower	Number.	Gross tonnage.	Horsepower.
Total	1,435	146,227	236,969	884	139,965	227,802	551	6,262	9,167	61.6	95.7	96.1	38.4	4.3	3.9
Freight and passenger	390	55,779	80,692	259	54,092	78,451	131	1,687	2,241	66.4	97.0	97.2	33.6	3.0	2.8
Tugs and other towing vessels	619	62,836	117,547	454	61,100	114,696	165	1,736	2,851	73.3	97.2	97.6	26.7	2.8	2.4
Ferryboats	166	22,180	28,220	117	21,321	27,372	49	859	848	70.5	96.1	97.0	29.5	3.9	3.0
Yachts	222	3,255	6,542	34	1,425	3,571	188	1,830	2,971	15.3	43.8	54.6	84.7	56.2	45.4
All other	38	2,177	3,968	20	2,027	3,712	18	150	256	52.6	93.1	93.5	47.4	6.9	6.5

Nearly two-fifths of the boats employed gasoline as the source of power, but their tonnage was only 4.3 per cent of the total tonnage and their horsepower only 3.9 per cent of the total horsepower. As the census was restricted to boats of 5 tons measurement or over, a very large number of small gasoline power boats was excluded. The use of the small gasoline boats has developed greatly within the last few years, and they are employed in all kinds of work—in freight and passenger and ferry service and in towing. The number and tonnage of these small excluded boats and the transportation service performed by them

must amount in the aggregate to large figures, and, if included in these statistics, would add materially to the totals. For example, one party does a large amount of business with a fleet of 5 gasoline towboats, each under 5 tons, and hence not included in the canvass. If a bargeload is too heavy for one boat, two or more are used as the case requires. A large amount of the river business is being captured by the small gasoline boats, since they do not require license or inspection, and since the economical advantages favor them; while the regulations governing steam craft and the requirements in regard to the employment of licensed engineers therefor operate against the use of small steam craft. Consequently the statistics of steam craft are more nearly complete, for there are few steampower craft of less than 5 tons measurement.

The average tonnage and the average horsepower per vessel, classified by character of propulsion and by character of power, are given in Table 15 for the several classes of service.

TABLE 15.—AVERAGE GROSS TONNAGE AND HORSEPOWER OF ALL POWER VESSELS, BY CHARACTER OF PROPULSION AND POWER, AND BY OCCUPATION: 1906.

OCCUPATION.	AVERAGE TONNAGE PER VESSEL.							AVERAGE HORSEPOWER PER VESSEL.		
	All vessels.	Character of propulsion.				Character of power.		All vessels.	Character of power.	
		Stern wheel.	Side wheel.	Center wheel.	Screw.	Steam.	Gasoline.		Steam.	Gasoline.
Total	102	110	334	154	25	158	11	165	258	17
Freight and passenger	143	137	424	.....	16	209	13	207	303	17
Tugs and other towing vessels	102	113	25	.....	51	135	11	190	253	17
Ferryboats	134	79	360	154	32	182	18	170	234	17
Yachts	15	25	16	.....	9	42	10	29	105	16
All other	57	78	224	.....	16	101	8	104	186	14

A summary of the vessels in service in 1906, by character of power and propulsion, with the percentage that each class of power formed of the total, is presented in Table 16.

TABLE 16.—*Number, gross tonnage, and horsepower of power vessels, by character of power and propulsion: 1906.*

	All vessels.	Stern wheel.	Side wheel.	Center wheel.	Screw.
Number	1,435	990	85	4	356
Steam	884	678	72	4	130
Gasoline	551	312	13	.....	226
Gross tonnage	146,227	108,405	28,372	616	8,834
Steam	139,965	104,476	28,221	616	6,652
Gasoline	6,262	3,929	151	.....	2,182
Horsepower	236,969	174,121	39,889	535	22,424
Steam	227,802	169,210	39,731	535	18,326
Gasoline	9,167	4,911	158	.....	4,098
	PER CENT OF TOTAL.				
Number	100.0	100.0	100.0	100.0	100.0
Steam	61.6	68.5	84.7	100.0	36.5
Gasoline	38.4	31.5	15.3	.....	63.5
Gross tonnage	100.0	100.0	100.0	100.0	100.0
Steam	95.7	96.4	99.5	100.0	75.3
Gasoline	4.3	3.6	0.5	.....	24.7
Horsepower	100.0	100.0	100.0	100.0	100.0
Steam	96.1	97.2	99.6	100.0	81.7
Gasoline	3.9	2.8	0.4	.....	18.3

The steam vessels show an average of 158 gross tons and 258 horsepower per vessel, and the gasoline boats an average of 11 gross tons and 17 horsepower per vessel.

In the 5 to 49 ton class in 1906, there were 788 power boats of 12,346 gross tonnage, the majority being gasoline, or motor boats. The gasoline boats in this class average per boat less than one-half the tonnage of the steam vessels. Table 17 shows the number and tonnage of the gasoline power boats, by tonnage groups.

TABLE 17.—*Number and gross tonnage of gasoline power boats, by tonnage groups: 1906.*

GROUP.	Number of vessels.	Gross tonnage.
Total	551	6,262
5 to 9 tons	291	2,001
10 to 19 tons	226	2,831
20 to 29 tons	11	250
30 to 39 tons	11	372
40 to 49 tons	3	129
50 to 99 tons	9	679

In 1906, 517 boats, or 36 per cent of all vessels in the steamer class, were gasoline power boats of less than 20 tons. More than one-third of all gasoline power boats were pleasure craft, as shown in Table 18, which gives the distribution of the boats according to occupation, or character of service.

TABLE 18.—*Number and gross tonnage of gasoline power boats, by occupation: 1906.*

OCCUPATION.	Number of vessels.	Gross tonnage.
Total	551	6,262
Freight and passenger	131	1,687
Tugs and other towing vessels	165	1,736
Ferryboats	49	859
Yachts	188	1,830
All other	18	150

The distribution of all craft by tonnage groups as reported for 1906 is shown in Table 19, which gives the number and tonnage of all vessels, by character of ownership and by character of service or occupation, with groupings by river districts.

TABLE 19.—VESSELS GROUPED ACCORDING TO GROSS TONNAGE, BY CLASS, OWNERSHIP, RIVER SYSTEMS, AND OCCUPATION: 1906.

CLASS, OWNERSHIP, RIVER SYSTEM, AND OCCUPATION.	TOTAL.		5 TO 49 TONS.		50 TO 99 TONS.		100 TO 199 TONS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Aggregate	9,622	4,411,967	1,383	31,759	682	48,654	1,912	295,536
Steam	1,435	146,227	788	12,346	265	19,991	183	26,898
Unrigged	8,187	4,265,740	595	19,413	417	28,663	1,729	268,638
Character of ownership:								
Steam	1,435	146,227	788	12,346	265	19,991	183	26,898
Individual	687	27,524	539	7,247	92	6,804	31	4,540
Firm	211	11,360	134	2,251	47	3,548	20	2,664
Incorporated company	524	106,575	105	2,646	126	9,639	131	19,594
Miscellaneous	13	768	10	202	.....	.....	1	100
Unrigged	8,187	4,265,740	595	19,413	417	28,663	1,729	268,638
Individual	631	107,131	178	4,542	105	7,079	195	23,456
Firm	322	37,986	74	1,615	92	6,890	121	18,131
Incorporated company	7,228	4,120,025	343	13,256	218	14,594	1,409	226,553
Miscellaneous	6	598	.....	.....	2	100	4	498
River systems and occupation:								
Steam	1,435	146,227	788	12,346	265	19,991	183	26,898
Freight and passenger	390	55,779	180	2,904	72	5,537	47	7,255
Tugs and other towing vessels	619	62,836	291	5,448	150	11,183	102	14,598
Ferryboats	166	22,180	84	1,727	30	2,254	21	3,121
Yachts	222	3,255	210	1,983	7	589	5	683
All other	38	2,177	23	284	6	428	8	1,241
Upper Mississippi system	417	21,313	308	4,288	57	4,284	32	4,691
Freight and passenger	133	12,440	80	1,229	22	1,652	14	2,155
Tugs and other towing vessels	89	4,506	55	1,070	24	1,803	7	987
Ferryboats	51	2,408	35	734	9	681	7	993
Yachts	129	1,753	124	1,099	1	98	4	556
All other	15	206	14	156	1	50	.....	.....
Ohio system	700	81,645	332	5,224	136	10,284	118	17,273
Freight and passenger	167	25,865	70	1,056	29	2,295	26	3,830
Tugs and other towing vessels	399	48,326	168	2,866	87	6,574	81	11,677
Ferryboats	63	5,276	36	702	14	978	4	625
Yachts	56	644	54	532	2	112	.....	.....
All other	15	1,534	4	68	4	325	7	1,141
Lower Mississippi system	318	43,269	148	2,834	72	5,423	33	4,934
Freight and passenger	90	17,474	30	619	21	1,590	7	1,270
Tugs and other towing vessels	131	10,004	68	1,512	39	2,806	14	1,934
Ferryboats	52	14,496	13	291	7	595	10	1,503
Yachts	37	858	32	352	4	379	1	127
All other	8	437	5	60	1	53	1	100
Unrigged	8,187	4,265,740	595	19,413	417	28,663	1,729	268,638
Upper Mississippi system	429	24,799	200	4,777	165	10,636	57	7,481
Ohio system	7,404	4,146,728	367	13,855	189	13,886	1,582	249,203
Lower Mississippi system	354	94,213	28	781	63	4,141	90	11,954

TABLE 19.—VESSELS GROUPED ACCORDING TO GROSS TONNAGE, BY CLASS, OWNERSHIP, RIVER SYSTEMS, AND OCCUPATION: 1906—Continued.

CLASS, OWNERSHIP, RIVER SYSTEM, AND OCCUPATION.	200 TO 299 TONS.		300 TO 399 TONS.		400 TO 499 TONS.		500 TO 999 TONS.		1,000 TONS AND OVER.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Aggregate	784	196,099	105	34,990	424	181,044	2,087	1,215,430	2,245	2,408,455
Steam	76	18,839	39	13,893	21	9,482	56	34,824	7	9,954
Unrigged	708	177,260	66	21,097	403	171,562	2,031	1,180,606	2,238	2,398,501
Character of ownership:										
Steam	76	18,839	39	13,893	21	9,482	56	34,824	7	9,954
Individual	13	3,217	3	1,035			9	4,681		
Firm	9	2,468			1	429				
Incorporated company	52	12,688	36	12,858	20	9,053	47	30,143	7	9,954
Miscellaneous	2	466								
Unrigged	708	177,260	66	21,097	403	171,562	2,031	1,180,606	2,238	2,398,501
Individual	74	17,693	5	1,717	4	1,621	58	35,823	12	15,200
Firm	24	6,250	7	2,500			4	2,000		
Incorporated company	610	153,317	54	16,880	399	169,941	1,969	1,142,183	2,226	2,383,301
Miscellaneous										
River systems and occupation:										
Steam	76	18,839	39	13,893	21	9,482	56	34,824	7	9,954
Freight and passenger	37	9,375	14	5,134	10	4,462	27	16,682	3	4,430
Tugs and other towing vessels	29	7,002	16	5,532	7	3,206	23	14,388	1	1,479
Ferryboats	9	2,238	9	3,227	4	1,814	6	3,754	3	4,045
Yachts										
All other	1	224								
Upper Mississippi system	11	2,522	1	360	2	919	6	4,249		
Freight and passenger	8	1,876	1	360	2	919	6	4,249		
Tugs and other towing vessels	3	646								
Ferryboats										
Yachts										
All other										
Ohio system	43	10,853	28	9,890	10	4,505	30	19,020	3	4,606
Freight and passenger	19	4,858	9	3,304	3	1,299	9	6,096	2	3,127
Tugs and other towing vessels	20	5,033	15	5,142	7	3,206	20	12,349	1	1,479
Ferryboats	4	962	4	1,434			1	575		
Yachts										
All other										
Lower Mississippi system	22	5,464	10	3,653	9	4,058	20	11,555	4	5,348
Freight and passenger	10	2,641	4	1,470	5	2,244	12	6,337	1	1,303
Tugs and other towing vessels	6	1,323	1	390			3	2,039		
Ferryboats	5	1,276	5	1,793	4	1,814	5	3,179	3	4,045
Yachts										
All other	1	224								
Unrigged	708	177,260	66	21,097	403	171,562	2,031	1,180,606	2,238	2,398,501
Upper Mississippi system	5	1,112	1	355	1	438				
Ohio system	651	163,757	29	10,008	371	157,653	1,988	1,154,220	2,227	2,384,146
Lower Mississippi system	52	12,391	36	10,734	31	13,471	43	26,386	11	14,355

The bulk of the freight business is handled on barges. Unrigged craft—barges, coal boats, etc.—constitute 85.1 per cent of the total number of vessels and 96.7 per cent of the total tonnage; and of the steam vessels, towboats constitute 43.1 per cent of the total number and 43 per cent of the total tonnage.

OWNERSHIP OF VESSELS.

Corporate ownership controlled 96.6 per cent of the tonnage of unrigged vessels and 72.9 per cent of the tonnage of steam vessels. In the case of the steam vessels owned by individuals the percentage for number is relatively large in comparison with the percentage for tonnage, as a result of the fact that the majority of such boats are of low tonnage. A large majority of the yachts or pleasure boats are owned by individuals, while corporate control prevails in the case of the larger boats. Thus in boats of the 5 to 49 ton class individual ownership was reported for 68.4 per cent of the number and 58.7 per cent of the tonnage of the steam vessels, as compared with 13.3 per cent of the number and 21.4 per cent of the tonnage for corporate ownership. In all the other tonnage groups for steam vessels corporate ownership is in a large majority, and with respect to unrigged vessels ownership by corporations leads in all tonnage groups. The number, gross tonnage, and value of the vessels in active service, by character of ownership, with the percentage in each class, is given in Table 20.

TABLE 20.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS AND CHARACTER OF OWNERSHIP: 1906.

CLASS AND OWNERSHIP.	VESSELS.		TONNAGE.		VALUE OF VESSELS.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.
Total	9,622	100.0	4,411,967	100.0	$22,852,142	100.0
Individual	1,318	13.7	134,655	3.1	3,114,755	13.6
Firm	533	5.5	49,346	1.1	1,341,901	5.9
Incorporated company	7,752	80.6	4,226,600	95.8	18,292,186	80.0
Miscellaneous	19	0.2	1,366	(1)	103,300	0.5
Steam	1,435	100.0	146,227	100.0	13,196,770	100.0
Individual	687	47.9	27,524	18.8	2,394,680	18.1
Firm	211	14.7	11,360	7.8	935,875	7.1
Incorporated company	524	36.5	106,575	72.9	9,783,915	74.1
Miscellaneous	13	0.9	768	0.5	82,300	0.6
Unrigged	8,187	100.0	4,265,740	100.0	9,655,372	100.0
Individual	631	7.7	107,131	2.5	720,075	7.5
Firm	322	3.9	37,986	0.9	406,026	4.2
Incorporated company	7,228	88.3	4,120,025	96.6	8,508,271	88.1
Miscellaneous	6	0.1	598	(1)	21,000	0.2

[1] Less than one-tenth of 1 per cent.

The large ownership by corporations is a striking feature of the table, likewise the comparatively small portion under firm control, the latter being less than the portion owned by individuals in number of vessels, tonnage, and value for both steam and unrigged vessels.

A showing of the number and tonnage of the vessels, according to character of ownership and by occupation, or character of service, is given in Table 21.

TABLE 21.—NUMBER AND GROSS TONNAGE OF VESSELS, BY CHARACTER OF OWNERSHIP AND BY CLASS AND OCCUPATION: 1906.

CLASS AND OCCUPATION.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	9,622	4,411,967	1,318	134,655	533	49,346	7,752	4,226,600	19	1,366
Steam	1,435	146,227	687	27,524	211	11,360	524	106,575	13	768
Freight and passenger	390	55,779	179	11,472	71	5,822	139	38,243	1	242
Tugs and other towing vessels	619	62,836	232	10,441	85	3,944	298	48,351	4	100
Ferryboats	166	22,180	73	2,349	27	1,384	65	18,403	1	44
Yachts	222	3,255	185	2,815	26	183	7	206	4	51
All other	38	2,177	18	447	2	27	15	1,372	3	331
Unrigged	8,187	4,265,740	631	107,131	322	37,986	7,228	4,120,025	6	598

The extent of concentration of the transportation business in the hands of the larger operators is indicated in Table 22.

TABLE 22.—*Number of proprietors owning three or more steam vessels, classified by occupation of vessel and by river systems: 1906.*

OCCUPATION AND RIVER SYSTEM.	VESSELS.		PROPRIETORS OWNING THREE OR MORE VESSELS.				
				Vessels.			
						Per cent of total.	
	Number.	Gross tonnage.	Number.	Number.	Gross tonnage.	Number.	Gross tonnage.
Freight and passenger	390	55,779	20	84	28,142	21.5	50.5
Upper Mississippi system			5	18	6,045		
Lower Mississippi system			3	15	6,649		
Ohio system			12	51	15,448		
Tugs and other towing vessels	619	62,836	12	131	32,609	21.2	51.9
Upper and Lower Mississippi systems			6	23	2,238		
Ohio system			6	108	30,371		
Ferryboats	166	22,180	[1] 4	21	5,699	12.7	25.7

[1] Lower Mississippi system, 2; Ohio system, 2.

In freight and passenger service more than one-fifth of the total number of vessels and one-half of the tonnage is in the hands of 20 owners; and of the towboats, more than one-fifth of the number and one-half of the tonnage is in the hands of 12 owners. Less concentration is shown for the ferryboats, ownership of 3 or more vessels being reported in only four cases.

The unrigged vessels show a materially greater degree of concentrated ownership, as indicated by the statistics presented in Table 23.

A little more than two-thirds of all unrigged vessels, the same constituting nearly four-fifths of the total tonnage, were reported for 10 owners, all of the Ohio system, each with 100 or more boats in operation. These represent the large coal companies of the Pittsburg district. The barge equipment of these 10 owners handled 43.4 per cent of all barge freight, including harbor work and the car freight transferred by railroad companies on barges. There were 58 owners each with from 10 to 99 boats in operation, and they are credited with 19.4 per cent of all unrigged boats, 17 per cent of the tonnage, and nearly one-third of the merchandise handled on unrigged boats.

TABLE 23.—PROPRIETORS OF UNRIGGED CRAFT, GROUPED ACCORDING TO NUMBER OF VESSELS OWNED AND RIVER SYSTEMS: 1906.

GROUP, AND RIVER SYSTEM.	Number of proprietors.	Number of boats.	Gross tonnage.	Freight and harbor work (net tons).	PER CENT.		
					Number of boats.	Gross tonnage.	Freight and harbor work.
Total		[1] 8,187	4,265,740	[2] 23,305,627	100.0	100.0	100.0
Proprietors owning less than 10 boats		1,089	138,346	5,949,783	13.3	3.2	25.5
Upper Mississippi system		336	18,184	979,903	4.1	0.4	4.2
Ohio system		517	65,799	1,846,128	6.3	1.5	7.9
Lower Mississippi system		236	54,363	3,123,752	2.9	1.3	13.4
Proprietors owning 10 but less than 100 boats	58	1,592	723,412	7,232,040	19.4	17.0	31.0
Upper Mississippi system	6	92	6,601	534,926	1.1	0.2	2.3
Ohio system	44	1,381	676,947	4,504,212	16.9	15.9	19.3
Lower Mississippi system	8	119	39,864	2,192,902	1.5	0.9	9.4
Proprietors owning 100 or more boats:							
Ohio system	10	[3] 5,506	3,403,982	10,123,804	67.3	79.8	43.4

[1] Active boats.
[2] Includes harbor work and railway car freight amounting to 6,129,920 tons, distributed as follows: Upper Mississippi system, 30,090 tons; Ohio system, 2,493,776 tons; Lower Mississippi system, 3,606,054 tons.
[3] Includes 2,054 coal boats, 2,037,526 gross tonnage, sold with cargo.

As shown in Table 19, less than one-half of the steam vessels and more than one-half of the tonnage of such vessels are credited to the Ohio system.

The Ohio system had the largest tonnage employed in freight and passenger service, while the Lower Mississippi, which was second in rank in this respect, had the largest average tonnage per vessel. The average tonnage per vessel for the 90 freight and passenger boats of the Lower Mississippi system was 194 tons, as compared with an average of 155 tons for the 167 similar boats of the Ohio system, and 94 tons for the 133 boats of like service for the Upper Mississippi system.

To handle its large fleet of barges, the Ohio system had nearly two-thirds of the towboats and a little more than three-fourths of the total towboat tonnage. The Lower Mississippi had over three-fifths of the ferryboat tonnage and the Upper Mississippi the majority of the yachts, in number and tonnage.

The miscellaneous class includes boats hired out for fishing or pleasure parties, dredges and work boats provided with propelling power, and in general all power craft not coming within the range of the other groups.

The Ohio system is credited with 90.4 per cent of the number and 97.2 per cent of the tonnage of the unrigged boats; the Lower Mississippi system, with 4.3 per cent of the number and 2.2 per cent of the tonnage; and the Upper Mississippi system, with 5.2 per cent of the number and six-tenths of 1 per cent of the tonnage.

VALUATION OF VESSELS.

Statistics in regard to vessel values, and the average value per ton and per vessel for both steam and unrigged craft, are shown in Table 24, which presents the figures for 1906 in comparison with 1889.

TABLE 24.—*Number, gross tonnage, and value of vessels by class: 1906 and 1889.*

CLASS.	Census.	Number of vessels.	Gross tonnage.	Value of vessels.	Average tonnage per vessel.	Average value per ton.	Average value per vessel.
Total	1906	9,622	4,411,967	$22,852,142	459	$5	$2,375
	1889	7,300	3,364,610	14,407,162	461	4	1,974
Steam	1906	1,435	146,227	13,196,770	102	90	9,196
	1889	972	192,974	9,622,608	199	50	9,900
Unrigged	1906	8,187	4,265,740	9,655,372	521	2	1,179
	1889	6,328	3,171,636	4,784,554	501	2	756

Steam vessels show a large increase in the average value per ton and a large decrease in the average tonnage per vessel, and unrigged vessels an increase in average tonnage, and an increase in the average value per vessel of 56 per cent.

VALUE OF LAND PROPERTY.

The value of all property other than vessels, but incident to their operation, was $5,685,900, comprising $5,570,823, the value of land, wharves, warehouses and other buildings, fixtures, machinery, implements, tools, cash on hand, etc., and $115,077, the value of leases. The addition of these amounts to the value of the vessels gives $28,538,042 as the aggregate value of all property in 1906.

Much of the land property owned by parties operating vessels and used in conjunction with the operation of the vessels, is used also for railroad, storage, mercantile, or other purposes; a large amount of wharf property, however, is owned by parties other than those operating water craft, and hence is not reported. The statistics in regard to the value of land property are therefore far from being complete.

EMPLOYEES AND WAGES.

Table 25 shows the statistics relating to the number of employees on vessels and on land, and the amounts paid in salaries and wages, for the different classes of vessels.

TABLE 25.—EMPLOYEES, AND SALARIES AND WAGES, BY OCCUPATION OF VESSEL: 1906.

OCCUPATION.	TOTAL.		ON VESSELS.		ON LAND.					
					Total.		Officers, managers, clerks, etc.		All other.	
	Number of employees.	Salaries and wages.	Number of employees.	Wages.	Average number of employees.	Salaries and wages.	Average number of employees.	Salaries.	Average number of employees.	Wages.
Total	17,473	$7,063,776	15,016	$5,692,117	2,457	$1,371,659	1,011	$686,536	1,446	$685,123
Freight and passenger	7,333	2,335,977	6,746	2,019,202	587	316,775	296	219,828	291	96,947
Towing vessels and unrigged craft	8,668	3,926,242	7,152	3,055,644	1,516	870,598	560	364,366	956	506,232
Ferryboats	838	493,961	699	413,553	139	80,408	120	72,192	19	8,216
Yachts	177	62,218	165	59,168	12	3,050	10	2,850	2	200
All other	457	245,378	254	144,550	203	100,828	25	27,300	178	73,528
	PER CENT OF TOTAL.									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Freight and passenger	42.0	33.1	44.9	35.5	23.9	23.1	29.3	32.0	20.1	14.2
Towing vessels and unrigged craft	49.6	55.6	47.6	53.7	61.7	63.5	55.4	53.1	66.1	73.9
Ferryboats	4.8	7.0	4.7	7.3	5.7	5.9	11.9	10.5	1.3	1.2
Yachts	1.0	0.9	1.1	1.0	0.5	0.2	1.0	0.4	0.1	(1)
All other	2.6	3.5	1.7	2.5	8.3	7.4	2.5	4.0	12.3	10.7

[1] Less than one-tenth of 1 per cent.

Towing vessels and unrigged craft gave employment to nearly one-half of all the employees, and the employees on such craft received more than one-half of the total amount paid in salaries and wages.

The crews on the vessels formed 85.9 per cent of the total number of employees, and they received in wages 80.6 per cent of the total amount paid to all employees, the land employees constituting 14.1 per cent of the total number and their salaries and wages 19.4 per cent of the total amount. In the case of towing vessels and ferries the land employees constituted a larger portion of all employees than they did in the case of freight and passenger boats. The amount paid in salaries and wages to land employees is, for all craft, about equally divided between the administrative and superintending employees, listed as officers, managers, clerks, etc., and the wage-earners. In the case of freight and passenger steamers the numbers in these two groups are nearly equal, while for ferryboats the land employees are chiefly officers, managers, and clerks, and for towing vessels and barges the "all other" class of employees is naturally largely in excess of the administrative men.

As a rule, the loading and unloading of freight on Mississippi river boats is done by roustabouts carried on the boats as part of the crew. Hence the crews of Mississippi river vessels are relatively larger than those for vessels operating on the Atlantic coast and Gulf of Mexico, the Pacific coast, or the Great Lakes. In handling coal and sand, which are the largest factors of the barge freight, machinery is extensively used. Moreover, the coal barges are frequently loaded by the regular employees of the coal companies and the unloading on delivery is frequently done by the consignees.

The crews of freight and passenger steam vessels for the Atlantic coast and the Gulf of Mexico average a man for every 42 tons of the gross tonnage of the vessels, and for freight and passenger vessels operating on the Great Lakes and the St. Lawrence river the average is a man for 107 tons of gross tonnage; whereas the freight and passenger vessels of the Mississippi river and its tributaries average a man for every 8 tons of gross tonnage. Of course, a large part of the difference is due to the fact that the Mississippi river vessels are much smaller boats than the ocean or lake steamers.

The "all other" employees on land constitute 22.1 per cent of the total number of employees on vessels and on land for the Atlantic coast and Gulf of Mexico district, and 14 per cent of the total number for the Great Lakes and St. Lawrence river, whereas for the Mississippi river and its tributaries this class constitutes but 8.3 per cent of the total number of employees.

GROSS INCOME.

The gross income from freight, passenger, and all other sources by class of vessels and the per cent each is of the total are shown in Table 26.

TABLE 26.—*Gross income of all vessels and craft, by source of income and by occupation of vessel: 1906.*

OCCUPATION.	Total.	SOURCE OF INCOME.		
		Freight.	Passengers.	All other.
Total	$17,342,038	$7,450,869	$2,281,243	$7,609,926
Freight and passenger	5,934,629	4,038,002	1,766,581	130,046
Towing vessels and unrigged craft	9,342,145	3,412,867	15,780	5,913,498
Ferryboats	1,553,121	.....	498,747	1,054,374
All other	512,143	.....	135	512,008
	PER CENT OF TOTAL.			
Total	100.0	100.0	100.0	100.0
Freight and passenger	34.2	54.2	77.4	1.7
Towing vessels and unrigged craft	53.9	45.8	0.7	77.7
Ferryboats	9.0	.....	21.9	13.9
All other	3.0	.....	(1)	6.7

[1] Less than one-tenth of 1 per cent.

The income of towing vessels and the unrigged craft towed by them exceeded the income of all other vessels. It will be observed that the income reported under "all other" for towing vessels and unrigged craft largely exceeds the amount reported for freight. This is due to the fact that the income for towboats reported separately, being for towing service only, is included under "all other income," and in certain cases operators owning both unrigged boats and towing vessels segregated the income and reported separate amounts for freight and for towing service, which latter appears under "all other."

To arrive at the total income derived from the handling of freight on barges, the amount paid for the towing service should be taken as a part of the freight income as well as the amount paid for the service rendered by the barge; except that when the barge owner does not own towing vessels, but hires them, the gross freight income of the barges includes the amount paid by the barge owner for towing, and hence in such cases the sum of the barge income and the towboat income involves a duplication. On the other hand, when barges and towing vessels are owned by the same party the income covers the entire service and is all directly chargeable to freight, even though a segregation of the income be made for towing service and for barge income.

A very large part of the $5,913,498 reported as "all other" income for towing vessels and unrigged craft represents towing service, and should be included along with the $3,412,867 reported as freight income to give the true income for the handling of freight on unrigged vessels.

The amount reported as income from "all other" sources for ferryboats represents all income for ferryboats except that derived from passengers, and the bulk of it is for the ferrying of teams, loaded vehicles, live stock, etc.

FREIGHT.

The freight handled by all water craft was 31,626,981 net tons of the following character:

Aggregate freight, all craft: 1906.

Aggregate net tons		31,626,981
Total shipped from one port to another		19,531,093
Carried on steamers	2,355,386	
Towed on barges	17,175,707	
Total lightered and transferred		12,095,888
Harbor work or lighterage	5,190,291	
Transferred by railway car ferries	6,905,597	

Included in the above, under car freight, are 3,770,340 tons, the estimated contents of 188,517 loaded cars, the freight contents of which were not reported (see Table 48). The total quantity of freight reported was therefore 27,856,641 tons. Ferry freight, live stock, and that carried in wagons are not included in these freight statistics for 1906, as the returns therefor were in the majority of cases not obtainable.

Freight proper, or merchandise shipped from one port to another, constituted 61.8 per cent of the total quantity handled by vessels; harbor work, or merchandise handled within the confines of a port, formed 16.4 per cent of the total; and freight ferried in cars, which is akin to lighterage, or harbor work, formed 21.8 per cent of the total.

The freight carried on the Mississippi river system decreased in quantity between 1889 and 1906, as shown by Table 27.

TABLE 27.—*Freight shipments, by river systems, with amount and per cent of decrease: 1906 and 1889.*

RIVER SYSTEM.	FREIGHT (NET TONS).			Per cent of decrease.
	1906	1889	Decrease.	
Total	19,531,093	28,289,503	8,758,410	31.0
Upper Mississippi	1,758,101	6,260,448	4,502,347	71.9
Ohio	15,226,805	15,796,968	570,163	3.6
Lower Mississippi	2,546,187	6,232,087	3,685,900	59.1

The heaviest decrease both in tonnage and in percentage is for the Upper Mississippi system, and the least is for the Ohio system. The above does not of course show the total freight movement on the several river systems, but as the statistics for both years are on a like basis they are properly comparable.

A showing of the chief freight commodities for 1906 in comparison with 1889 is given in Table 28.

The decrease in lumber tonnage nearly equals the net decrease in all freight, while the decrease in all other commodities is 73,169 tons, or four-tenths of 1 per cent of the tonnage of the remaining commodities. But there is a very heavy increase in stone, sand, etc. (chiefly sand), and a large tonnage increase in coal. These two commodity groups now constitute more than three-fourths of the freight. The decreases in grain, cotton, iron ore, ice, and miscellaneous merchandise are all large.

DEPARTURE OF COAL FLEETS FROM PITTSBURG, PA.

TABLE 28.—*Freight, by commodities, with amount and per cent of increase: 1906 and 1889.*

COMMODITY.	FREIGHT (NET TONS).			
	1906	1889	Increase.	
			Amount.	Per cent.
Total	19,531,093	28,289,503	[1] 8,758,410	[1] 31.0
Cement, brick, and lime	95,443	2,193	93,250	4,252.2
Coal	11,033,011	8,527,428	2,505,583	29.4
Cotton	146,975	895,742	[1] 748,767	[1] 83.6
Flour	81,900	[2] 89,992	[1] 8,092	[1] 9.0
Fruits and vegetables	55,703	41,748	13,955	33.4
Grain	380,721	1,712,498	[1] 1,331,777	[1] 77.8
Ice	17,229	91,010	[1] 73,781	[1] 81.1
Iron ore	171,779	574,790	[1] 403,011	[1] 70.1
Lumber	514,950	[3] 9,200,191	[1] 8,685,241	[1] 94.4
Petroleum and other oils	365,479	3,534	361,945	10,241.8
Pig iron and steel rails	55,346	[4] 7,775	47,571	611.8
Stone, sand, etc	4,004,259	321,054	3,683,205	1,147.2
Tobacco	114,000	27,707	86,293	311.4
Miscellaneous merchandise	2,494,298	6,793,841	[1] 4,299,543	[1] 63.3

[1] Decrease.
[2] Mill products.
[3] Lumber and forest products.
[4] Iron, pig and bloom.

Since the reports for both 1889 and 1906 show under "miscellaneous merchandise" considerable freight that could not be segregated by commodities, for the reason that in many cases no record was kept of the kind of freight handled, considerable quantities of the specified commodities are necessarily included with commodities not specifically called for by the schedule. Hence, except in the case of coal, stone, and sand, or such commodities as are freighted in bulk, the tonnage shown for specific commodities is less than the actual amounts.

Table 29 is a presentation of freight, by commodities, and by river systems and rivers, for 1889 and 1906. Each river has been credited with the freight shipped from its ports or landings, and the table shows freight shipments only—or the freight emanating on the respective rivers. For comparative purposes, lumber and petroleum and other oils, which commodities are expressed in feet and barrels, respectively, in other tables, are here given in net tons.

TABLE 29.—FREIGHT SHIPMENTS, BY COMMODITIES, AND BY RIVER SYSTEMS AND RIVERS: 1906 AND 1889.

RIVER SYSTEM AND RIVER.	Year.	Total (net tons).	Cement, brick, and lime (net tons).	Coal (net tons).	Cotton (net tons).	Fruits and vegetables (net tons).	Grain (net tons).	Ice (net tons).	Iron ore (net tons).	Lumber (net tons).	Petroleum and other oils (net tons).	Stone, sand, etc. (net tons).	Tobacco (net tons).	Miscellaneous merchandise (net tons).
Total	1906	19,531,093	95,443	11,033,011	146,975	55,703	380,721	17,229	171,779	514,950	365,479	4,004,259	114,000	2,631,544
	1889	28,289,503	2,193	8,527,428	895,742	41,748	1,712,498	91,010	574,790	[1] 9,200,191	3,534	321,054	27,707	6,891,608
Upper Mississippi system	1906	1,758,101	15,238	27,421	.....	11,397	92,868	1,792	2	12,676	526	1,274,785	318	321,078
	1889	6,260,448	.....	64,086	.....	.....	227,000	87,000	1,500	4,649,430	.....	.....	.....	1,231,432
Upper Mississippi	1906	595,885	14,546	20,110	.....	10,845	30,813	1,743	2	6,494	347	363,859	210	146,916
	1889	3,947,364	.....	10,624	.....	.....	23,000	45,050	.....	3,372,874	.....	.....	.....	495,816
Illinois	1906	105,826	50	6,245	.....	140	31,936	.....	.....	114	135	160	100	66,946
	1889	180,264	.....	2,300	.....	.....	18,000	41,950	.....	742	.....	.....	.....	117,272
All others rivers[2]	1906	1,056,390	642	1,066	.....	412	30,119	49	.....	6,068	44	910,766	8	107,216
	1889	2,132,820	.....	51,162	.....	.....	186,000	.....	1,500	1,275,814	.....	.....	.....	618,344
Ohio system	1906	15,226,805	70,329	10,968,307	40,628	39,743	230,705	11,387	171,777	279,436	18,477	1,969,732	112,453	1,313,831
	1889	15,796,968	2,193	8,102,543	31,064	21,690	203,092	10	573,290	3,812,013	3,534	201,054	27,707	2,818,778
Ohio	1906	3,142,097	59,099	1,048,038	2,848	36,587	171,346	6,554	71,777	78,508	17,031	901,586	91,630	656,433
	1889	7,525,667	.....	4,018,787	18,522	.....	125,000	.....	11,656	1,131,755	.....	.....	.....	2,219,947
Big Sandy	1906	1,776	3	.....	.....	15	100	.....	.....	1,077	11	.....	3	567
	1889	286,483	.....	.....	.....	2,511	423	.....	.....	142,950	.....	.....	.....	140,599
Cumberland	1906	348,697	1,485	450	.....	1,100	6,570	400	.....	64,577	54	85,000	3,620	185,441
	1889	974,316	.....	.....	.....	.....	20,983	.....	.....	810,716	.....	89,964	10,201	42,452
Green	1906	305,144	865	125,301	.....	29	1,590	145	.....	64,829	236	4,050	500	107,599
	1889	819,278	168	45,904	.....	501	1,431	.....	.....	752,541	.....	788	4,723	13,222
Kanawha	1906	975,031	1,802	934,608	.....	1,582	6,420	813	.....	3,308	810	2,200	891	22,597
	1889	1,145,202	863	941,446	.....	.....	.....	.....	.....	80,468	.....	.....	.....	122,425
Little Kanawha	1906	11,239	38	.....	.....	.....	847	.....	.....	.....	110	.....	.....	10,244
	1889	115,657	.....	1,100	.....	.....	.....	.....	.....	109,079	678	.....	.....	4,800
Monongahela	1906	8,925,923	3,600	8,828,315	.....	.....	.....	200	.....	160	.....	72,000	.....	21,648
	1889	3,294,932	.....	3,059,418	.....	.....	.....	.....	33,386	81,209	.....	.....	.....	120,919
Muskingum	1906	13,826	800	710	.....	280	2,090	150	.....	287	79	50	100	9,280
	1889	10,281	.....	.....	.....	.....	1,693	.....	.....	475	.....	.....	.....	8,113
Tennessee	1906	678,501	2,573	30,285	37,780	100	17,143	3,125	100,000	55,368	146	148,153	709	283,119
	1889	909,078	962	35,888	12,542	18,657	28,812	10	528,248	163,113	406	21,137	10,000	89,303
Wabash	1906	42,427	64	.....	.....	.....	24,599	.....	.....	10,037	.....	1,900	.....	5,827
	1889	93,178	.....	.....	.....	.....	17,759	.....	.....	63,300	.....	5,754	.....	6,365
All other rivers[3]	1906	782,144	.....	.....	.....	50	.....	.....	.....	1,225	.....	754,783	15,000	11,076
	1889	622,896	200	.....	.....	21	6,991	.....	.....	476,407	2,450	83,411	2,783	50,633

[1] Lumber and forest products, including rafted forest products.
[2] Includes in 1906, Gasconade, Kansas, Minnesota, Missouri, Osage, St. Croix, Salt of Iowa; in 1889, Chippewa, Gasconade, Missouri, Osage, and St. Croix.
[3] Includes in 1906, Allegheny, Kentucky, and Salt of Kentucky; in 1889, Allegheny and Kentucky.

TABLE 29.—FREIGHT SHIPMENTS, BY COMMODITIES, AND BY RIVER SYSTEMS AND RIVERS: 1906 AND 1889—Cont'd.

RIVER SYSTEM AND RIVER.	Year.	Total (net tons).	Cement, brick, and lime (net tons).	Coal (net tons).	Cotton (net tons).	Fruits and vegetables (net tons).	Grain (net tons).	Ice (net tons).	Iron ore (net tons).	Lumber (net tons).	Petroleum and other oils (net tons).	Stone, sand, etc. (net tons).	Tobacco (net tons).	Miscellaneous merchandise (net tons).
Lower Mississippi system	1906	2,546,187	9,876	37,283	106,347	4,563	57,148	4,050	.....	222,838	346,476	759,742	1,229	996,635
	1889	6,232,087	.....	360,799	864,678	20,058	1,282,406	4,000	.....	738,748	.....	120,000	.....	2,841,398
Lower Mississippi [1]	1906	2,329,350	8,339	36,849	64,709	3,991	51,334	3,786	.....	198,936	346,084	756,716	1,180	857,426
	1889	4,206,745	.....	183,848	783,458	.....	954,803	.....	.....	310,654	.....	.....	.....	1,973,982
Arkansas	1906	24,994	110	410	4,489	317	1,777	112	.....	3,130	161	.....	7	14,481
	1889	1,662,717	.....	165,888	35,003	20,058	282,086	4,000	.....	302,690	.....	120,000	.....	732,992
Ouachita (or Wichita) and Black of Louisiana	1906	25,136	64	.....	7,933	20	1,357	32	.....	3,638	92	3,016	15	8,969
	1889	93,707	.....	.....	.....	.....	16,652	.....	.....	29,110	.....	.....	.....	47,945
Red	1906	14,417	135	.....	6,480	.....	365	.....	.....	432	6	.....	.....	6,999
	1889	105,145	.....	11,063	29,676	.....	6,000	.....	.....	4,577	.....	.....	.....	53,829
White	1906	43,933	.....	.....	282	.....	.....	.....	.....	13,250	.....	.....	.....	30,401
	1889	86,393	.....	.....	7,403	.....	.....	.....	.....	63,856	.....	.....	.....	15,134
Yazoo	1906	108,357	1,228	24	22,454	235	2,315	120	.....	3,452	133	10	27	78,359
	1889	77,380	.....	.....	9,138	.....	22,865	.....	.....	27,861	.....	.....	.....	17,516

[1] Includes the Atchafalaya, Black of Arkansas, Black bayou, Lafourche, Macon bayou, St. Francis, and Tensas.

Under "all other merchandise," as shown in Table 29, are included certain commodities that are given separately in other tables, namely, canned goods, flour, naval stores, pig iron and steel rails, and phosphate and fertilizer, for which the returns for 1889 and 1906 are not specifically comparable.

The grain traffic has suffered a heavy decline, the aggregate of shipments shrinking from 1,712,498 tons in 1889 to 380,721 tons in 1906, a decrease of 77.8 per cent. This decrease has been for the Mississippi, the Ohio system showing a small gain. The decrease in shipments on the Upper Mississippi was from 227,000 tons to 92,868 tons, or 59.1 per cent, and on the Lower Mississippi, from 1,282,406 tons to 57,148 tons, or 95.5 per cent. The latter reflects the decrease in the grain barge traffic from St. Louis to the seaboard, as further shown by the following statement, which is taken from the report of the Merchants' Exchange of St. Louis for 1903, and gives the grain shipment by barges for a series of years.

The decrease in the grain barge traffic for the period from 1889 to 1903 amounted to 80.6 per cent.

Shipment of bulk grain by river from St. Louis to New Orleans: 1889 to 1903.

YEAR.	Quantity (bushels).	YEAR.	Quantity (bushels).
1903	2,749,441	1895	1,690,417
1902	2,591,735	1894	2,345,503
1901	2,363,949	1893	7,079,598
1900	3,314,160	1892	8,414,940
1899	2,233,235	1891	8,468,546
1898	6,600,707	1890	10,217,244
1897	5,475,342	1889	14,158,046
1896	10,527,208		

The movement of petroleum and other oils shows a very large increase, due chiefly to the development of the oil fields of Louisiana, which state first became a producer of petroleum in 1902. The bulk of the oil movement is on the Lower Mississippi.

The bulk of the freight is towed on barges, a little less than one-eighth being carried on freight and passenger vessels. The quantity of freight which is carried and towed in the several river districts and the leading rivers thereof is shown in Table 30, by commodities.

TABLE 30.—FREIGHT SHIPMENTS ON STEAM VESSELS AND ON UNRIGGED CRAFT, BY COMMODITIES AND BY RIVER SYSTEMS AND RIVERS: 1906.

CLASS, RIVER SYSTEM, AND RIVER.	Total (net tons).	Canned goods (net tons).	Cement, brick, lime (net tons).	Coal (net tons).	Cotton (net tons).	Flour (net tons).	Fruits and vegetables (net tons).	Grain (net tons).	Ice (net tons).	Iron ore (net tons).	Lumber (M feet).	Naval stores (net tons).	Petroleum and other oils (barrels).	Phosphate and fertilizer (net tons).	Pig iron and steel rails (net tons).	Stone, sand, etc. (net tons).	Tobacco (net tons).	Miscellaneous merchandise (net tons).
Total	19,531,093	63,697	95,443	11,033,011	146,975	81,900	55,703	380,721	17,229	171,779	[1] 225,545	770	[2] 2,256,230	44,413	55,346	4,004,259	114,000	2,385,418
Steam	2,355,386	62,949	43,185	50,361	140,022	80,426	50,627	235,550	16,592	402	61,815	770	96,919	41,433	47,092	59,343	113,937	1,275,661
Unrigged	17,175,707	748	52,258	10,982,650	6,953	1,474	5,076	145,171	637	171,377	163,730	.....	2,159,311	2,980	8,254	3,944,916	63	1,109,757
Upper Mississippi system	1,758,101	2,763	15,238	27,421	.....	5,061	11,397	92,868	1,792	2	7,164	58	2,336	179	400	1,274,785	318	312,617
Steam	273,362	2,566	1,208	1,027	.....	4,596	9,837	47,832	1,695	2	3,129	58	1,915	154	400	23,680	310	174,029
Unrigged	1,484,739	197	14,030	26,394	.....	465	1,560	45,036	97	.....	4,035	.....	421	25	.....	1,251,105	8	138,588
Upper Mississippi	595,885	1,998	14,546	20,110	.....	4,238	10,845	30,813	1,743	2	3,752	58	1,540	149	.....	363,859	210	140,473
Steam	153,932	1,991	713	26	.....	4,218	9,385	30,480	1,661	2	1,302	58	1,295	149	.....	22,850	207	79,646
Unrigged	441,953	7	13,833	20,084	.....	20	1,460	333	82	.....	2,450	.....	245	.....	.....	341,009	3	60,827
Illinois	105,826	510	50	6,245	.....	500	140	31,936	.....	.....	72	.....	600	.....	.....	160	100	65,936
Steam	32,764	510	50	15	.....	200	105	2,500	.....	.....	40	.....	600	.....	.....	160	100	28,926
Unrigged	73,062	.....	.....	6,230	.....	300	35	29,436	.....	.....	32	.....	.....	.....	.....	.....	.....	37,010
Missouri	1,037,059	170	530	889	.....	225	260	25,743	49	.....	2,272	.....	120	30	400	910,221	8	94,270
Steam	84,790	65	445	868	.....	157	197	14,121	34	.....	1,752	.....	20	5	400	250	3	65,081
Unrigged	952,269	105	85	21	.....	68	63	11,622	15	.....	520	.....	100	25	.....	909,971	5	29,189
All other rivers [3]	19,331	85	112	177	.....	98	152	4,376	.....	.....	1,068	.....	76	.....	.....	545	.....	11,938
Steam	1,876	.....	.....	118	.....	21	150	731	.....	.....	35	.....	.....	.....	.....	420	.....	376
Unrigged	17,455	85	112	59	.....	77	2	3,645	.....	.....	1,033	.....	76	.....	.....	125	.....	11,562
Ohio system	15,226,805	46,793	70,329	10,968,307	40,628	55,836	39,743	230,705	11,387	171,777	141,173	105	82,121	36,094	54,410	1,969,732	112,453	1,120,593
Steam	1,246,437	46,578	35,532	48,616	40,628	55,560	36,258	137,447	10,967	400	38,957	105	81,751	35,649	46,306	35,034	112,403	509,448
Unrigged	13,980,368	215	34,797	10,919,691	.....	276	3,485	93,258	420	171,377	102,216	.....	370	445	8,104	1,934,698	50	611,145
Ohio	3,142,097	42,468	59,099	1,048,638	2,848	33,851	36,587	171,346	6,554	71,777	38,661	.....	75,691	31,753	53,810	901,586	91,630	494,551
Steam	888,562	42,360	31,678	46,941	2,848	33,790	33,152	105,376	6,134	400	19,685	.....	75,661	31,748	46,306	4,831	91,580	354,390
Unrigged	2,253,535	108	27,421	1,001,697	.....	61	3,435	65,970	420	71,377	18,976	.....	30	5	7,504	896,755	50	140,161
Big Sandy	1,776	22	3	.....	.....	70	15	100	.....	.....	540	.....	50	.....	.....	.....	3	475
Steam	779	22	3	.....	.....	70	15	100	.....	.....	40	.....	50	.....	.....	.....	3	475
Unrigged	997	.....	.....	.....	.....	.....	.....	.....	.....	.....	500	.....	.....	.....	.....	.....	.....	.....
Cumberland	348,697	154	1,485	450	.....	3,571	1,100	6,570	400	.....	34,635	105	240	1,020	.....	85,000	3,620	180,591
Steam	70,440	154	455	.....	.....	3,571	1,100	6,570	400	.....	3,520	105	240	1,020	.....	30,000	3,620	16,828
Unrigged	278,257	.....	1,030	450	.....	.....	.....	.....	.....	.....	31,115	.....	.....	.....	.....	55,000	.....	163,763
Green	305,144	60	865	125,301	.....	480	29	1,590	145	.....	30,936	.....	1,050	275	.....	4,050	500	106,784
Steam	19,106	60	865	.....	.....	480	29	1,240	145	.....	590	.....	1,050	275	.....	.....	500	14,040
Unrigged	286,038	.....	.....	125,301	.....	.....	.....	350	.....	.....	30,346	.....	.....	.....	.....	4,050	.....	92,744
Kanawha	975,031	3,720	1,802	934,608	.....	2,885	1,582	6,420	813	.....	2,113	.....	3,600	305	.....	2,200	891	15,687
Steam	36,621	3,720	1,172	.....	.....	2,885	1,582	6,420	813	.....	2,013	.....	3,600	305	.....	.....	891	14,872
Unrigged	938,410	.....	630	934,608	.....	.....	.....	.....	.....	.....	100	.....	.....	.....	.....	2,200	.....	815
Little Kanawha	11,239	84	38	.....	.....	355	.....	847	.....	.....	.....	.....	490	.....	.....	.....	.....	9,805
Steam	9,496	12	3	.....	.....	140	.....	393	.....	.....	.....	.....	200	.....	.....	.....	.....	8,903
Unrigged	1,743	72	35	.....	.....	215	.....	454	.....	.....	.....	.....	290	.....	.....	.....	.....	902
Monongahela	8,925,923	.....	3,600	8,828,315	.....	.....	.....	.....	200	.....	97	.....	.....	.....	.....	72,000	.....	21,648
Steam	13,319	.....	.....	.....	.....	.....	.....	.....	200	.....	72	.....	.....	.....	.....	.....	.....	13,000
Unrigged	8,912,604	.....	3,600	8,828,315	.....	.....	.....	.....	.....	.....	25	.....	.....	.....	.....	72,000	.....	8,648
Muskingum	13,826	60	800	710	.....	1,015	280	2,090	150	.....	170	.....	350	400	.....	50	100	7,805
Steam	13,826	60	800	710	.....	1,015	280	2,090	150	.....	170	.....	350	400	.....	50	100	7,805
Unrigged	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	678,501	225	2,573	30,285	37,780	5,609	100	17,143	3,125	100,000	30,130	.....	650	2,341	600	148,153	709	274,344
Steam	167,494	190	556	965	37,780	5,609	100	15,048	3,125	.....	12,786	.....	600	1,901	.....	153	709	75,785
Unrigged	511,007	35	2,017	29,320	.....	.....	.....	2,095	.....	100,000	17,344	.....	50	440	600	148,000	.....	198,559
Wabash	42,427	.....	64	.....	.....	.....	.....	24,599	.....	.....	3,276	.....	.....	.....	.....	1,900	.....	5,827
Steam	1,264	.....	.....	.....	.....	.....	.....	210	.....	.....	66	.....	.....	.....	.....	.....	.....	850
Unrigged	41,163	.....	64	.....	.....	.....	.....	24,389	.....	.....	3,210	.....	.....	.....	.....	1,900	.....	4,977
All other rivers [4]	782,144	.....	.....	.....	.....	8,000	50	.....	.....	.....	615	.....	.....	.....	.....	754,793	15,000	3,076
Steam	25,530	.....	.....	.....	.....	8,000	.....	.....	.....	.....	15	.....	.....	.....	.....	.....	15,000	2,500
Unrigged	756,614	.....	.....	.....	.....	.....	50	.....	.....	.....	600	.....	.....	.....	.....	754,793	.....	576

[1] Net tons, 514,950.
[2] Net tons, 365,479.
[3] Includes Gasconade, Minnesota, Osage, St. Croix, and Salt of Iowa.
[4] Includes Allegheny, Kentucky, and Salt of Kentucky.

TABLE 30.—FREIGHT SHIPMENTS ON STEAM VESSELS AND ON UNRIGGED CRAFT, BY COMMODITIES AND BY RIVER SYSTEMS AND RIVERS: 1906—Continued.

CLASS, RIVER SYSTEM, AND RIVER.	Total (net tons).	Canned goods (net tons).	Cement, brick, lime (net tons).	Coal (net tons).	Cotton (net tons).	Flour (net tons).	Fruits and vegetables (net tons).	Grain (net tons).	Ice (net tons).	Iron ore (net tons).	Lumber (M feet).	Naval stores (net tons).	Petroleum and other oils (barrels).	Phosphate and fertilizer (net tons).	Pig iron and steel rails (net tons).	Stone, sand, etc. (net tons).	Tobacco (net tons).	Miscellaneous merchandise (net tons).
Lower Mississippi system.	2,546,187	14,141	9,876	37,283	106,347	21,003	4,563	57,148	4,050	.....	77,208	607	2,171,773	8,140	536	759,742	1,229	952,208
Steam	835,587	13,805	6,445	718	99,394	20,270	4,532	50,271	3,930	.....	19,729	607	13,253	5,630	386	629	1,224	592,184
Unrigged	1,710,600	336	3,431	36,565	6,953	733	31	6,877	120	.....	57,479	.....	2,158,520	2,510	150	759,113	5	360,024
Lower Mississippi	2,168,581	13,317	8,194	36,549	60,789	16,081	3,946	50,809	3,716	.....	46,098	607	2,026,885	3,526	376	756,716	1,159	756,396
Steam	693,516	13,081	4,819	284	58,064	15,601	3,915	44,239	3,666	.....	9,514	607	11,415	3,516	376	613	1,154	529,894
Unrigged	1,475,065	236	3,375	36,265	2,725	480	31	6,570	50	.....	36,584	.....	2,015,470	10	.....	756,103	5	226,502
Arkansas	24,994	125	110	410	4,489	233	317	1,777	112	.....	2,065	.....	714	4	.....	.....	7	14,119
Steam	23,175	125	110	410	4,489	233	317	1,777	112	.....	865	.....	714	4	.....	.....	7	14,119
Unrigged	1,819	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,200	.....	.....	.....	.....	.....	.....	.....
Black of Arkansas	20,059	.....	.....	.....	410	50	.....	.....	20	.....	3,714	.....	.....	.....	.....	.....	.....	12,300
Steam	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....
Unrigged	20,036	.....	.....	.....	410	50	.....	.....	20	.....	3,702	.....	.....	.....	.....	.....	.....	12,300
Ouachita (or Wichita) and Black of Louisiana	25,136	70	64	.....	7,933	1,063	20	1,357	32	.....	2,971	.....	410	2,025	.....	3,016	15	5,811
Steam	18,125	70	28	.....	7,900	1,060	20	1,350	32	.....	678	.....	410	2,025	.....	16	15	4,687
Unrigged	7,011	.....	36	.....	33	3	.....	7	.....	.....	2,293	.....	.....	.....	.....	3,000	.....	1,124
Red	14,417	100	135	.....	6,480	276	.....	365	.....	.....	240	.....	25	85	.....	.....	.....	6,538
Steam	14,147	100	135	.....	6,480	276	.....	365	.....	.....	90	.....	25	85	.....	.....	.....	6,538
Unrigged	270	.....	.....	.....	.....	.....	.....	.....	.....	.....	150	.....	.....	.....	.....	.....	.....	.....
White	43,933	.....	.....	.....	282	.....	.....	.....	.....	.....	6,525	.....	.....	.....	.....	.....	.....	30,401
Steam	25,433	.....	.....	.....	282	.....	.....	.....	.....	.....	6,525	.....	.....	.....	.....	.....	.....	11,901
Unrigged	18,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,500
Yazoo	108,357	279	1,228	24	22,454	2,950	235	2,315	120	.....	1,425	.....	589	.....	10	10	27	75,120
Steam	52,751	279	1,228	24	19,579	2,950	235	2,315	120	.....	1,375	.....	589	.....	10	.....	27	22,520
Unrigged	55,606	.....	.....	.....	2,875	.....	.....	.....	.....	.....	50	.....	.....	.....	.....	10	.....	52,600
All other rivers and bayous[1]	140,710	250	145	300	3,510	350	45	525	50	.....	14,170	.....	143,150	2,500	150	.....	21	51,523
Steam	8,417	150	125	.....	2,600	150	45	225	.....	.....	670	.....	100	.....	.....	.....	21	2,525
Unrigged	132,293	100	20	300	910	200	.....	300	50	.....	13,500	.....	143,050	2,500	150	.....	.....	48,998

[1] Includes Atchafalaya, Black bayou, Lafourche, Macon bayou, St. Francis, and Tensas.

The quantity of freight towed exceeds the quantity carried on steamers in the case of a large majority of the rivers shown in detail.

Table 31 shows the percentages for the several rivers of the freight carried on steamers and that towed on unrigged vessels.

TABLE 31.—*Per cent of freight carried on steamers and towed on unrigged vessels: 1906.*

RIVER SYSTEM AND RIVER.	Carried on steamers.	Towed on unrigged vessels.
Total	12.1	87.9
Upper Mississippi system	15.5	84.5
Upper Mississippi	25.8	74.2
Illinois	31.0	69.0
Missouri	8.2	91.8
All other rivers	9.7	90.3

TABLE 31.—*Per cent of freight carried on steamers and towed on unrigged vessels: 1906*—Continued.

RIVER SYSTEM AND RIVER.	Carried on steamers.	Towed on unrigged vessels.
Ohio system	8.2	91.8
Ohio	28.3	71.7
Big Sandy	43.9	56.1
Cumberland	20.2	79.8
Green	6.3	93.7
Kanawha	3.8	96.2
Little Kanawha	84.5	15.5
Monongahela	0.1	99.9
Muskingum	100.0	.....
Tennessee	24.7	75.3
Wabash	3.0	97.0
All other rivers	3.3	96.7
Lower Mississippi system	32.8	67.2
Lower Mississippi	32.0	68.0
Arkansas	92.7	7.3
Black of Arkansas	0.1	99.9
Ouachita and Black of Louisiana	72.1	27.9
Red	98.1	1.9
White	57.9	42.1
Yazoo	48.7	51.3
All other rivers and bayous	6.0	94.0

The rivers on which steamer freight is in excess of barge freight are the Muskingum and Little Kanawha of the Ohio system and the Red, Arkansas, Ouachita and Black of Louisiana, and White of the Lower Mississippi system. It should be remembered that rafts and logs towed in the water are not included in any of the freight statistics for 1906.

Coal and sand, stone, etc., constituted 86.9 per cent of all barge freight. For the Upper Mississippi system these commodities formed 86 per cent of all barge freight; for the Ohio system, 91.9 per cent; and for the Lower Mississippi system, 46.5 per cent.

The freight receipts for the different commodities are shown by river systems and rivers in Table 32.

TABLE 32.—FREIGHT RECEIPTS, BY COMMODITIES AND BY RIVER SYSTEMS AND RIVERS: 1906.

RIVER SYSTEM AND RIVER.	Total (net tons).	Canned goods (net tons).	Cement, brick, and lime (net tons).	Coal (net tons).	Cotton (net tons).	Flour (net tons).	Fruits and vegetables (net tons).	Grain (net tons).	Ice (net tons).	Iron ore (net tons).	Lumber (M ft.).	Naval stores (net tons).	Petroleum and other oils (barrels).	Phosphate and fertilizer (net tons).	Pig iron and steel rails (net tons).	Stone, sand, etc. (net tons).	Tobacco (net tons).	Miscellaneous merchandise (net tons).
Total	19,531,093	63,697	95,443	11,033,011	146,975	81,900	55,703	380,721	17,229	171,779	[1]225,545	770	[2]2,256,230	44,413	55,346	4,004,259	114,000	2,385,418
Upper Mississippi system	1,753,501	6,258	15,803	27,492	50	5,726	5,674	68,750	2,297	2	7,194	108	2,996	264	400	1,274,654	548	330,872
Upper Mississippi	597,025	4,948	15,026	20,145	.....	5,138	5,190	7,406	2,203	2	3,871	103	2,750	209	.....	363,503	410	164,422
Illinois	105,002	810	50	6,260	50	250	130	31,936	40	.....	62	5	.....	.....	.....	360	125	64,841
Missouri	1,045,300	415	615	910	.....	240	202	26,932	54	.....	3,091	.....	170	55	400	910,371	13	99,371
All other rivers[3]	6,174	85	112	177	.....	98	152	2,476	.....	.....	170	.....	76	.....	.....	420	.....	2,238
Ohio system	14,036,946	46,793	65,970	9,798,750	40,218	57,617	39,748	229,212	11,687	171,777	139,768	105	82,321	36,094	54,410	1,925,442	112,480	1,107,663
Ohio	12,296,037	39,140	50,987	9,321,447	3,580	30,450	36,657	169,555	6,619	71,777	103,185	100	73,246	29,794	43,256	1,268,501	104,821	859,159
Big Sandy	4,887	30	3	8	.....	100	15	205	.....	.....	40	.....	110	.....	.....	.....	3	4,365
Cumberland	178,951	184	1,470	450	.....	4,425	1,300	6,472	400	.....	20,385	5	150	1,020	1,000	85,000	4,770	24,246
Green	80,902	285	1,247	32,970	.....	1,330	349	540	260	.....	1,580	.....	2,905	500	.....	3,360	.....	36,932
Kanawha	63,832	4,720	4,072	9,670	.....	5,915	1,047	6,265	1,345	.....	1,927	.....	4,160	1,857	1,950	2,250	2,343	17,746
Little Kanawha	6,953	109	38	40	.....	580	.....	889	.....	.....	.....	.....	250	.....	.....	.....	.....	5,241
Monongahela	545,716	.....	3,600	420,780	.....	.....	.....	.....	200	.....	97	.....	.....	.....	7,504	91,472	.....	22,000
Muskingum	11,073	100	1,140	650	.....	540	280	1,780	300	.....	140	.....	850	670	100	50	100	4,935
Tennessee	472,759	225	3,349	12,735	36,638	6,277	100	16,690	2,563	100,000	9,123	.....	650	2,253	600	151,711	443	124,636
Wabash	30,537	.....	64	.....	.....	.....	.....	15,316	.....	.....	3,276	.....	.....	.....	.....	1,900	.....	5,827
All other rivers[4]	345,299	2,000	.....	.....	.....	8,000	.....	11,500	.....	.....	15	.....	.....	.....	.....	321,198	.....	2,576
Lower Mississippi system	3,740,646	10,646	13,670	1,206,769	106,707	18,557	10,281	82,759	3,245	.....	78,583	557	2,170,913	8,055	536	804,163	972	946,883
Lower Mississippi	3,487,137	5,407	10,459	1,205,985	91,425	7,466	9,322	59,318	1,679	.....	63,922	557	2,023,841	3,741	386	801,026	795	814,972
Arkansas	35,871	758	110	410	1,399	1,345	633	9,849	112	.....	1,052	.....	1,606	4	.....	.....	47	18,743
Black of Arkansas	20,049	.....	.....	.....	410	50	.....	.....	20	.....	3,702	.....	.....	.....	.....	.....	.....	12,300
Ouachita (or Wichita) and Black of Louisiana	18,998	731	464	.....	1,750	1,760	10	2,650	204	.....	328	.....	526	1,525	.....	3,000	65	6,016
Red	8,481	220	160	.....	480	416	.....	625	.....	.....	215	.....	55	125	.....	.....	.....	5,988
White	25,433	.....	.....	.....	282	.....	.....	.....	.....	.....	6,525	.....	.....	.....	.....	.....	.....	11,901
Yazoo	62,325	3,257	2,307	74	10,761	7,140	316	9,952	910	.....	1,677	.....	1,730	160	.....	137	45	23,393
All other rivers and bayous[5]	82,352	273	170	300	200	380	.....	365	320	.....	1,162	.....	143,155	2,500	150	.....	20	53,570

[1] Net tons, 514,950.
[2] Net tons, 365,479.
[3] Includes Gasconade, Minnesota, Osage, St. Croix, and Salt of Iowa.
[4] Includes Allegheny, Kentucky, and Salt of Kentucky.
[5] Includes Atchafalaya, Black bayou, Lafourche, Macon bayou, St. Francis, and Tensas.

For the Upper Mississippi system the difference in quantity between the freight shipments (Table 30) and the freight receipts (Table 32) is small, but for the Ohio and the Lower Mississippi systems there are material differences. The freight shipments for the Ohio system exceed the receipts by 1,189,859 tons, chiefly represented by the 1,169,557 tons of excess of coal shipments over receipts. This coal goes to lower river ports and appears under coal receipts in the Lower Mississippi system, the coal receipts of the latter district exceeding the coal shipments of the same by 1,169,486 tons.

The freight receipts for the Ohio river exceed the shipments by 9,153,940 tons, which excess is composed chiefly of 8,272,809 tons of coal received from the Monongahela and Kanawha rivers; of 64,524,215 feet of lumber coming from the Cumberland, Green, and Tennessee rivers; of 366,915 tons of stone, sand, etc., from tributaries of the Ohio; and 364,608 tons of miscellaneous merchandise, from tributaries of the Ohio and other rivers. Shipments materially in excess of receipts are shown for each tributary of the Ohio, with the exception of the Big Sandy, the freight movements being chiefly to lower river ports.

Next to coal the chief commodity is sand, but the water transportation of sand is in general restricted to short hauls, which seldom extend farther than the river on which they emanate. Hence the shipments and deliveries of stone, sand, etc., approximate each other closely for most of the rivers, the chief exceptions being the Ohio and "all other rivers" of the Ohio system; the exception in these cases, however, is more apparent than real, as the difference is due chiefly to sand shipped from the Allegheny river to Pittsburg.

Table 33 shows the tons of freight shipped from and received at the leading ports, the chief commodities, coal and stone, sand, etc., being shown separately for the several ports.

TABLE 33.—FREIGHT SHIPMENTS AND RECEIPTS AND TOTAL FREIGHT HANDLED, BY RIVER SYSTEMS AND PORTS: 1906.

RIVER SYSTEM AND PORT.	Total freight movement (net tons).	SHIPMENTS.				RECEIPTS.			
		Total (net tons).	Coal (net tons).	Stone, sand, etc. (net tons).	All other merchandise (net tons).	Total (net tons).	Coal (net tons).	Stone, sand, etc. (net tons).	All other merchandise (net tons).
Aggregate		19,531,093	11,033,011	4,004,259	4,493,823	19,531,093	11,033,011	4,004,259	4,493,823
Upper Mississippi system		1,758,101	27,421	1,274,785	455,895	1,753,501	27,492	1,274,654	451,355
Alton, Ill.	33,604	5,967	20		5,967	27,617		22,331	5,286
Burlington, Iowa	35,777	4,856		1	4,855	30,921		19,500	11,421
Clinton, Iowa	37,503	1,898			1,898	35,605		28,995	6,610
Davenport, Iowa	95,163	11,735		8,100	3,635	83,428		80,100	3,328
Dubuque, Iowa	10,260	526			526	9,734			9,734
Galena, Ill.	5,439	1			1	5,438		5,311	127
Kansas City, Mo.[1]	645,954	250			250	645,704		645,064	640
Moline, Ill.	56,336	2,219			2,219	54,117		54,111	6
Muscatine, Iowa	21,934	1,392	6		1,386	20,542		12,000	8,542
Pekin, Ill.	10,050					10,050			10,050
Peoria, Ill.	29,277	21,409	15	160	21,234	7,868	180		7,688
Quincy, Ill.	39,222	5,221			5,221	34,001		20,000	14,001
Rock Island, Ill.	84,594	23,202	14,000	8,100	1,102	61,392		60,600	792
All other ports		1,679,405	13,380	1,258,424	407,601	727,084	27,312	326,642	373,130
Ohio system		15,226,805	10,968,307	1,969,732	2,288,766	14,036,946	9,798,750	1,925,442	2,312,754
Allegheny, Pa.	81,209	7,960		3,460	4,500	73,249	57,749		15,500
Bowling Green, Ky.	50,367	13,119			13,119	37,248	28,705	3,250	5,293
Burnside, Ky.	32,175	4,708	450		4,258	27,467			27,467
Catlettsburg, Ky.[1]	9,694	4,254	8		4,246	5,440		5,000	440
Charleston, W. Va.[1]	38,650	21,430			21,430	17,220			17,220
Chattanooga, Tenn.	91,061	19,250	150	300	18,800	71,811		59,000	12,811
Cincinnati, Ohio[1]	2,363,215	231,368	33,384	630	197,354	2,131,847	1,904,242	113,920	113,685
Decatur, Ala.	81,078	18,003	500		17,503	63,075		300	62,775
Evansville, Ind.	416,133	57,762		260	57,502	358,371	114,988	73,600	169,783
Florence, Ala.	27,040	5,000			5,000	22,040			22,040
Grayville, Ill.	10,607					10,607		460	10,147
Knoxville, Tenn.[1]	77,828	4,232	100		4,132	73,596		73,000	596
Livermore, Ky.	8,516	5,363			5,363	3,153	960		2,193
Louisville, Ky.	1,203,727	86,772			86,772	1,116,955	684,775	235,000	197,180
Madison, Ind.	107,053	21,495	510		20,985	85,558	50,000		35,558
Marietta, Ohio	33,480	15,883			15,883	17,597	60	17	17,520
Nashville, Tenn.[1]	99,193	11,920			11,920	87,273		55,000	32,273
Paducah, Ky.	239,808	48,977	1,170	3,784	44,023	190,831	93,541	18,328	78,962
Parkersburg, W. Va.	56,547	35,649	75	10,938	24,636	20,898	2,500		18,398
Pittsburg, Pa.[1]	6,854,575	493,702	370,672	47,472	75,558	6,360,873	5,832,195	465,077	63,601
Terre Haute, Ind.	4,980	200			200	4,780			4,780
Wheeling, W. Va.	161,550	42,360	700	18,000	23,660	119,190	840	22,074	96,276
Vincennes, Ind.	2,014	64			64	1,950			1,950
All other ports		14,077,334	10,560,588	1,884,888	1,631,858	3,135,917	1,028,195	801,416	1,306,306
Lower Mississippi system		2,546,187	37,283	759,742	1,749,162	3,740,646	1,206,769	804,163	1,729,714
Alexandria, La.	6,147	3,718			3,718	2,429			2,429
Baton Rouge, La.[1]	15,508	4,896		2,000	2,896	10,612	9,403		1,209
Cairo, Ill.[1]	247,239	13,130	122		13,008	234,109	62,007	25,000	147,102
Greenville, Miss.[1]	89,519	16,189	11		16,178	73,330	19,101		54,229
Helena, Ark.	60,463	2,052	50		2,002	58,411	7,329		51,082
Little Rock, Ark.[1]	5,476	2,560	205		2,355	2,916			2,916
Memphis, Tenn.[1]	662,308	395,494		330,113	65,381	266,814	103,706		163,108
Monroe, La.	21,141	15,848			15,848	5,293			5,293
Natchez, Miss.	56,966	14,531			14,531	42,435	36,085		6,350
New Orleans, La.[1]	1,036,613	58,483	2,540	435	55,508	978,130	702,906	86,000	189,224
Pine Bluff, Ark.	11,393	5,902	205		5,697	5,491			5,491
Shreveport, La.	4,026	2,182			2,182	1,844			1,844
St. Louis, Mo.[1]	743,981	77,901	71	35	77,795	666,080	191,914	309,391	164,775
Vicksburg, Miss.	375,454	232,061		112	231,949	143,393	43,987		99,406
Yazoo City, Miss.	27,130	8,777	50	25	8,702	18,353		10	18,343
All other ports		1,692,463	34,029	427,022	1,231,412	1,231,006	30,331	383,762	816,913

[1] See Table 35 for harbor freight.

In cases where the port freight as reported to the Census is for boats owned by less than 3 operators, the port has been included under "all other ports," in order not to disclose individual operations. For this reason certain important ports can not be shown separately.

The bulk of the freight reported under "stone, sand, etc.," was sand dredged in the neighborhood of the port at which it was delivered, and in certain cases such freight constituted the bulk of the freight handled. This is notably the case in most of the ports of the Upper Mississippi system. Table 34 shows the ports where the "stone, sand, etc.," delivered constitute more than one-half of the total freight handled.

TABLE 34.—*Ports where the stone, sand, etc., received form the bulk of all freight handled: 1906.*

PORT.	Total freight handled (tons).	Stone, sand, etc., received (tons).	All other merchandise handled (tons).
Upper Mississippi system:			
Alton, Ill.	33,604	22,331	11,273
Burlington, Iowa	35,777	19,500	16,277
Clinton, Iowa	37,503	28,995	8,508
Davenport, Iowa	95,163	80,100	15,063
Galena, Ill.	5,439	5,311	128
Kansas City, Mo.	645,954	645,064	890
Moline, Ill.	56,336	54,111	2,225
Muscatine, Iowa	21,934	12,000	9,934
Quincy, Ill.	39,222	20,000	19,222
Rock Island, Ill.	84,594	60,600	23,994
Ohio system:			
Catlettsburg, Ky.	9,694	5,000	4,694
Chattanooga, Tenn.	91,061	59,000	32,061
Knoxville, Tenn.	77,828	73,000	4,828
Nashville, Tenn.	99,193	55,000	44,193

The sand included as freight does not include the sand that was dredged and delivered within the confines of a port; this sand shipment has been classified as harbor work.

Ranked by the quantity of freight handled Pittsburg is easily first, followed by Cincinnati, Louisville, New Orleans, St. Louis, and Memphis in the order named. Kansas City is seventh, according to total tonnage, but practically all of the freight is sand, the quantity of other freight being small. Hence, as a general freight port, the rank of Kansas City is low. Evansville, Vicksburg, Cairo, Paducah, Wheeling, and Madison follow in the order named, these comprising all of the specified ports showing more than 100,000 tons of freight movement.

Freight classified as harbor work, or lighterage, amounted to 5,190,291 tons, exclusive of car freight handled by the car ferries, for which see Table 48. Table 35 shows the distribution of harbor work.

TABLE 35.—*Harbor work, by river systems, rivers, and ports: 1906.*

RIVER SYSTEM, RIVER, AND PORT.	Total (tons).	Coal (tons).	Sand (tons).	Miscellaneous merchandise (tons).
Aggregate	5,190,291	238,302	4,698,161	253,828
Upper Mississippi system	482,090	3,200	477,962	928
Mississippi river	459,105	.....	458,727	378
Illinois river	2,700	2,400	.....	300
Missouri river	19,485	.....	19,235	250
Kansas City, Mo.	5,000	.....	5,000	.....
All other ports	14,485	.....	14,235	250
St. Croix river	800	800	.....	.....
Ohio system	2,354,147	.....	2,354,147	.....
Ohio river	2,249,122	.....	2,249,122	.....
Catlettsburg, Ky	20,000	.....	20,000	.....
Cincinnati, Ohio	72,000	.....	72,000	.....
Pittsburg, Pa.	2,102,122	.....	2,102,122	.....
All other ports	55,000	.....	55,000	.....
Cumberland river	28,125	.....	28,125	.....
Nashville, Tenn	28,125	.....	28,125	.....
Kanawha river	72,400	.....	72,400	.....
Charleston, W. Va	72,400	.....	72,400	.....
Tennessee river	4,500	.....	4,500	.....
Knoxville, Tenn	4,500	.....	4,500	.....
Lower Mississippi system	2,354,054	235,102	1,866,052	252,900
Mississippi river	2,322,624	235,102	1,844,622	242,900
Baton Rouge, La	42,400	35,000	3,000	4,400
Cairo, Ill	14,600	14,600	.....	.....
Greenville, Miss	89,000	.....	.....	89,000
Memphis, Tenn	195,000	120,000	75,000	.....
New Orleans, La	107,500	26,500	6,500	74,500
St. Louis, Mo	939,002	39,002	930,000	.....
All other ports	905,122	.....	830,122	75,000
Arkansas river	21,430	.....	21,430	.....
Little Rock, Ark	21,430	.....	21,430	.....
Yazoo river	10,000	.....	.....	10,000

In considering the total merchandise handled at the different ports the tonnage shown in Table 35 should be added to that reported as freight in Table 33. Thus the total quantities handled at the specified ports for which harbor work was reported (exclusive of car freight) were as follows:

TABLE 36.—*Total freight and harbor work for ports reporting harbor work: 1906.*

PORT.	Total (tons).	Freight handled (tons).	Harbor work (tons).
Baton Rouge, La	57,908	15,508	42,400
Cairo, Ill	[1] 261,839	247,239	14,600
Catlettsburg, Ky	29,694	9,694	20,000
Charleston, W. Va	[1] 111,050	38,650	72,400
Cincinnati, Ohio	2,435,215	2,363,215	72,000
Greenville, Miss	178,519	89,519	89,000
Kansas City, Mo	650,954	645,954	5,000
Knoxville, Tenn	82,328	77,828	4,500
Little Rock, Ark	25,906	5,476	21,430
Memphis, Tenn	[1] 857,308	662,308	195,000
Nashville, Tenn	127,318	99,193	28,125
New Orleans, La	[1] 1,144,113	1,036,613	107,500
Pittsburg, Pa	8,956,697	6,854,575	2,102,122
St. Louis, Mo	[1] 1,712,983	743,981	969,002

[1] Does not include freight ferried in railway cars.

The ranking ports, when all merchandise is considered, are the following, the list including all ports showing over 100,000 tons of freight shipped and received and harbor work exclusive of car freight:

Ports showing over 100,000 tons of freight shipped and received: 1906.

PORT.	Tons.	PORT.	Tons.
Pittsburg, Pa.	8,956,697	Vicksburg, Miss.	375,454
Cincinnati, Ohio	2,435,215	Cairo, Ill.	261,839
St. Louis, Mo.	1,712,983	Paducah, Ky.	239,808
Louisville, Ky.	1,203,727	Greenville, Miss.	178,519
New Orleans, La.	1,144,113	Wheeling, W. Va.	161,550
Memphis, Tenn.	857,308	Nashville, Tenn.	127,318
Kansas City, Mo.	650,954	Charleston, W. Va.	111,050
Evansville, Ind.	416,133	Madison, Ind.	107,053

PASSENGERS.

A comparative statement of the passengers carried by ferryboats and all other vessels on the Mississippi river and its tributaries is given in Table 37.

The many bridges now crossing the Upper Mississippi, the Missouri, and the Ohio rivers have resulted in a large decrease since 1889 in the number of ferry passengers on these rivers, while the Lower Mississippi, which is bridged only at St. Louis and Memphis, shows a large increase.

The statistics in detail with respect to passenger traffic for 1906 are given in Table 38.

The passengers carried by a vessel are credited to the river on which the chief port or home port of the vessel is located, and it therefore follows that in the case of boats plying on more than one river, the river on which the home port is located has received credit for all passengers, even though they be local passengers between landings on another river.

TABLE 37.—NUMBER OF PASSENGERS, BY RIVER SYSTEMS, WITH PER CENT OF INCREASE AND PER CENT OF TOTAL: 1906, 1889, AND 1880.

RIVER SYSTEM AND CLASS OF PASSENGERS.	1906	1889	1880	PER CENT OF INCREASE.		PER CENT OF TOTAL.		
				1889 to 1906	1880 to 1889	1906	1889	1880
Total	[1]14,122,241	10,858,894	6,728,067	30.1	61.4	100.0	100.0	100.0
Ferryboats	[1]10,022,612	8,474,646	5,199,984	18.3	63.0	71.0	78.0	77.3
All other vessels	4,099,629	2,384,248	1,528,083	71.9	56.0	29.0	22.0	22.7
Upper Mississippi system	2,333,084	1,821,734	1,380,912	28.1	31.9	100.0	100.0	100.0
Ferryboats	890,836	1,482,984	1,026,182	[2]39.9	44.5	38.2	81.4	74.3
All other vessels	1,442,248	338,750	354,730	325.8	[2]4.5	61.8	18.6	25.7
Ohio system	4,776,088	6,503,143	3,961,798	[2]26.6	64.1	100.0	100.0	100.0
Ferryboats	2,951,908	4,996,549	3,000,862	[2]40.9	66.5	61.8	76.8	75.7
All other vessels	1,824,180	1,506,594	960,936	21.1	56.8	38.2	23.2	24.3
Lower Mississippi system	7,013,069	2,534,017	1,385,357	176.8	82.9	100.0	100.0	100.0
Ferryboats	6,179,868	1,995,113	1,172,940	209.8	70.1	88.1	78.7	84.7
All other vessels	833,201	538,904	212,417	54.6	153.7	11.9	21.3	15.3

[1] Includes 371,514 passengers ferried in railway cars on the Ohio, Tennessee, and Lower Mississippi rivers. [2] Decrease.

TABLE 38.—NUMBER OF PASSENGERS, BY CLASS OF VESSELS AND BY RIVER SYSTEMS AND RIVERS: 1906.

RIVER SYSTEM AND RIVER.	Aggregate.	FREIGHT AND PASSENGER VESSELS.			FERRYBOATS.			TUGS AND OTHER TOWING VESSELS.			BARGES.		
		Total.	Regular.	Excursion.	Total.	Regular.	Excursion.	Total.	Regular.	Excursion.	Total.	Regular.	Excursion.
Aggregate	[1]14,122,241	[2]3,809,550	1,765,998	[2]2,043,552	10,022,612	[1]9,807,731	214,881	58,688	29,459	29,229	231,391	17,772	213,619
Upper Mississippi system	2,333,084	1,211,910	404,988	[2]806,922	890,836	890,159	677	3,947	317	3,630	226,391	16,772	209,619
Upper Mississippi	1,419,070	692,814	268,731	[2]424,083	673,997	673,370	627	3,868	238	3,630	48,391	6,772	41,619
Illinois	455,935	277,856	44,089	233,767	.....	.....	.....	79	79	.....	178,000	10,000	168,000
Missouri	382,040	165,201	87,199	78,002	216,839	216,789	50	.....	.....	.....	.....	.....	.....
All other rivers[3]	76,039	76,039	4,969	71,070	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio system	4,776,088	1,788,531	1,027,023	761,508	2,951,908	2,768,304	183,604	30,649	6,280	24,369	5,000	1,000	4,000
Ohio	4,059,617	1,247,184	725,436	521,748	2,783,387	2,599,783	183,604	28,046	5,180	22,866	1,000	1,000	.....
Big Sandy	4,555	4,555	4,555	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland	43,865	14,862	12,062	2,800	24,600	24,600	.....	403	.....	403	4,000	.....	4,000
Green	45,326	44,826	42,876	1,950	.....	.....	.....	500	300	200	.....	.....	.....
Kanawha	77,952	77,152	55,212	21,940	.....	.....	.....	800	800	.....	.....	.....	.....
Kentucky	7,752	7,752	7,212	540	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Kanawha	13,263	13,263	13,263	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monongahela	246,486	246,486	78,486	168,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Muskingum	76,480	76,480	53,665	22,815	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	122,401	42,799	33,956	8,843	78,702	78,702	.....	900	.....	900	.....	.....	.....
Wabash	78,391	13,172	300	12,872	65,219	65,219	.....	.....	.....	.....	.....	.....	.....
Lower Mississippi system	7,013,069	809,109	333,987	475,122	6,179,868	6,149,268	30,600	24,092	22,862	1,230	.....	.....	.....
Lower Mississippi	6,926,616	780,476	316,062	464,414	6,122,173	6,091,573	30,600	23,967	22,837	1,130	.....	.....	.....
Arkansas	75,370	21,040	11,172	9,868	54,330	54,330	.....	.....	.....	.....	.....	.....	.....
Ouachita and Black of Louisiana	4,900	1,775	1,775	.....	3,000	3,000	.....	125	25	100	.....	.....	.....
Red	1,790	1,790	950	840	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Francis	1,340	1,340	1,340	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
White	104	104	104	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yazoo	2,284	2,284	2,284	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other rivers[4]	665	300	300	.....	365	365	.....	.....	.....	.....	.....	.....	.....

[1] Includes 371,514 passengers ferried in railway cars on the Ohio, Tennessee, and Lower Mississippi rivers.
[2] Includes 700 excursion passengers on yachts.
[3] Includes Minnesota, St. Croix, Salt of Iowa, and Wisconsin.
[4] Includes Forked Deer river and Black bayou.

FERRYBOATS.

Statistics of the ferries for the years 1889 and 1906 are presented in Table 39.

TABLE 39.—*Ferryboats, with per cent of increase: 1906 and 1889.*

	1906	1889	Per cent of increase.
Number of vessels	[1] 166	163	1.8
Gross tonnage	22,180	18,593	19.3
Value of vessels	$1,776,360	$1,056,250	68.2
Gross income	$1,553,121	$1,196,817	29.8
From passengers	$498,747	.....	.....
From all other sources	$1,054,374	.....	.....
Number of employees	699	893	[2] 21.7
Wages	$413,553	$456,676	[2] 9.4
Number of passengers carried	[1] 10,022,612	8,474,646	18.3

[1] Includes 14 railway ferry steamers, with 350,282 passengers. [2] Decrease.

The ferry passengers formed 71 per cent of all passengers for all vessels reported for 1906, as compared with 78 per cent in 1889. The ferrying of wagons, teams, and live stock forms a large part of the ferryboat traffic, and since the income therefrom is reported as income from "all other sources," this item is largely in excess of passenger income.

The distribution of the ferries by river systems is indicated in Table 40.

TABLE 40.—*Ferryboats, by river systems: 1906.*

RIVER SYSTEM.	Number of vessels.	Gross tonnage.	Number of passengers carried.
Total	166	22,180	10,022,612
Upper Mississippi	51	2,408	890,836
Ohio	63	5,276	2,951,908
Lower Mississippi	52	14,496	6,179,868
	PER CENT OF TOTAL.		
Total	100.0	100.0	100.0
Upper Mississippi	30.7	10.9	8.9
Ohio	38.0	23.8	29.5
Lower Mississippi	31.3	65.4	61.7

The ferry passengers of the Upper Mississippi system numbered 673,997 for the Mississippi river and 216,839 for the Missouri. The 2,951,908 ferry passengers of the Ohio system were distributed as follows: Ohio river, 2,783,387; Cumberland river, 24,600; Tennessee river, 78,702; and Wabash river, 65,219. The ferry passengers of the Lower Mississippi system numbered 6,122,173 for the Mississippi river itself; 54,330 for the Arkansas; and 3,365 for the minor tributaries.

The principal ferry points and the only centers, or districts, for which detailed statistics can be given without disclosing individual operations are New Orleans and St. Louis, the statistics for which districts are presented in Table 41.

TABLE 41.—FERRYBOATS, BY DISTRICTS, WITH PER CENT IN EACH DISTRICT: 1906.

DISTRICT.	Number of vessels.	Gross tonnage.	Value of vessels.	GROSS INCOME.			Number of employees.	Wages.	Number of passengers carried.
				Total.	Passengers.	All other sources.			
Total	166	22,180	$1,776,360	$1,553,121	$498,747	$1,054,374	699	$413,553	10,022,612
New Orleans	11	1,598	214,000	154,415	49,730	104,685	65	25,467	3,524,470
St. Louis	10	4,061	241,047	631,434	79,504	551,930	72	65,675	1,633,113
All other	145	16,521	1,321,313	767,272	369,513	397,759	562	322,411	4,865,029
	PER CENT OF TOTAL.								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
New Orleans	6.6	7.2	12.0	9.9	10.0	9.9	9.3	6.2	35.2
St. Louis	6.0	18.3	13.6	40.7	15.9	52.3	10.3	15.9	16.3
All other	87.3	74.5	74.4	49.4	74.1	37.7	80.4	78.0	48.5

No income was reported for 212,710 out of the 350,282 railway ferry passengers included in the above tables, all the revenue being reported as for railway service.

Only one ferry, that at Wabasha, Minn., was reported as operated under municipal ownership.

In addition to the foregoing there are a few team boats, or boats using horse treadmills for motive power, which, not being within the scope of the steam vessel class, have been included in the class of unrigged vessels. There are 6 boats of this character in use on the Upper Mississippi and Ohio systems, all side wheelers, the detailed statistics of which are given in Table 42.

TABLE 42.—*Team boats: 1906.*

Number of boats	6
Gross tonnage	106
Value of property	$7,600
Boats	$5,700
All other property	$1,300
Leases	$600
Gross income	$4,970
From freight	$500
From passengers	$645
From all other sources (ferrying teams, etc.)	$3,825
Employees on boats:	
Number	6
Wages	$1,992
Number of passengers carried	4,200
Freight carried (net tons)	1,000

The bridging of the Mississippi and its tributaries has of course been a factor in reducing the ferry traffic, which would have otherwise reached much larger proportions. The points at which the Mississippi, Mis-

souri, and Ohio rivers are spanned by bridges, either railway or highway, are as follows:

The upper Mississippi river at and below St. Paul:
Minnesota.—St. Paul, 7; Hastings, 2; Winona, 3; Red Wing, Reads Landing.
Wisconsin.—La Crosse, 2; Prairie du Chien.
Iowa.—Eagle Point, Dubuque, 2; Sabula, Lyons, Clinton, 2; Muscatine, Burlington, Fort Madison, Keokuk.
Illinois.—Rock Island, 2; Keithsburg, Quincy, Alton.
Missouri.—Hannibal, Louisiana.
The Missouri river, below Bismarck, North Dakota.
South Dakota.—Pontis, Pierre, Chamberlain.
Iowa.—Sioux City, 2.
Nebraska.—Blair, Omaha, 3; Plattsmouth, Nebraska City, Rulo.
Kansas.—Atchison, Leavenworth, Fort Leavenworth.
Missouri.—St. Joseph, Kansas City, 2; Randolph, Sibley, Glasgow, Boonville, Jefferson City, St. Charles, Fort Bellefontaine.
The Ohio river:
Pennsylvania.—Pittsburg-Allegheny, 2; Neville Island, 3; Rochester, Beaverboro.
Ohio.—East Liverpool, 2; Steubenville, 2; Mingo, Bellaire, Marietta, Cincinnati, 5.
West Virginia.—Wheeling, 3; Parkersburg, Point Pleasant, Kenova.
Kentucky.—Ashland, Louisville, 2; Henderson.
Indiana.—New Albany.
Illinois.—Cairo.
The lower Mississippi river:
Missouri.—St. Louis, 2; Memphis.

YACHTS.

The yachts of the Mississippi river and its tributaries are all power boats. Tables 43 and 44 give the number, tonnage, and value of the yachts in service during the year, the former table showing the distribution according to character of power, and the latter the distribution according to means of propulsion.

TABLE 43.—YACHTS—NUMBER, GROSS TONNAGE, AND VALUE, BY CHARACTER OF POWER: 1906.

RIVER SYSTEM.	TOTAL.			STEAM.			GASOLINE.		
	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	222	3,255	$563,400	34	1,425	$278,275	188	1,830	$285,125
Upper Mississippi	130	1,946	296,100	18	1,050	156,575	112	896	139,525
Ohio	56	644	136,700	9	152	69,050	47	492	67,650
Lower Mississippi	36	665	130,600	7	223	52,650	29	442	77,950
	PER CENT OF TOTAL.								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Upper Mississippi	58.6	59.8	52.6	52.9	73.7	56.3	59.6	49.0	48.9
Ohio	25.2	19.8	24.3	26.5	10.7	24.8	25.0	26.9	23.7
Lower Mississippi	16.2	20.4	23.2	20.6	15.6	18.9	15.4	24.2	27.3

TABLE 44.—YACHTS—NUMBER, GROSS TONNAGE, AND VALUE, BY CHARACTER OF PROPULSION AND RIVER SYSTEMS: 1906.

RIVER SYSTEM.	TOTAL.			STERN WHEEL.			SIDE WHEEL.			SCREW.		
	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	222	3,255	$563,400	70	1,774	$240,400	6	96	$10,550	146	1,385	$312,450
Upper Mississippi	130	1,946	296,100	32	1,091	149,400	3	65	8,800	95	790	137,900
Ohio	56	644	136,700	24	254	26,650	1	12	1,000	31	378	109,050
Lower Mississippi	36	665	130,600	14	429	64,350	2	19	750	20	217	65,500

The gasoline boats constituted 84.7 per cent of the total number, 56.2 per cent of the tonnage, and a little more than one-half of the value of the pleasure craft.

WORK BOATS.

A large number of work boats other than freight carriers are included among the unrigged craft. They comprise dredges, sand pump boats, derrick barges, pile drivers, and other work craft not equipped with propelling power. The statistics pertaining to boats of this character, so far as they can be segregated, are presented in Tables 45 and 46. In some cases dredges, derrick barges, and like boats have been reported in connection with freight carrying barges, and in such cases, when possible, the details for the work boats have been segregated by apportionment. Table 45 shows the statistics for derrick, elevator, diving, and pile driving barges, and Table 46 shows the statistics for dredges and sand pump boats.

TABLE 45.—*Statistics of derrick, elevator, diving, and pile driving barges, by river systems: 1906.*

RIVER SYSTEM.	Number.	Gross tonnage.	Value.	Gross income.	Number of employees.	Wages.
Total	43	3,915	$164,650	$172,212	169	$75,436
Upper Mississippi	11	462	22,050	37,805	30	12,553
Ohio	15	1,140	50,400	40,820	47	23,251
Lower Mississippi	17	2,313	92,200	93,587	92	39,632

TABLE 46.—*Statistics of dredges and sand pump boats, by river systems: 1906.*

RIVER SYSTEM.	Number.	Gross tonnage.	Value.	Gross income.	Number of employees.	Wages.
Total	87	9,239	$752,918	$742,218	484	$205,511
Upper Mississippi	32	2,688	226,850	281,920	222	122,171
Ohio	40	4,527	382,768	322,413	168	123,890
Lower Mississippi	15	2,024	143,300	137,885	94	49,450

RAILWAY SHIPPING.

Freight and passenger cars are ferried at fourteen points on the Mississippi river and its tributaries. The transfer points are as follows:

On the Ohio river: Between Brookport, Ill., and Paducah, Kentucky.

On the Tennessee river: Between Gunters Landing and Hobbs Island, Alabama.

On the Kanawha river: Between Charleston and South Buffner, West Virginia.

On the Mississippi river: Between St. Louis, Mo., and East St. Louis, Ill.; Ivory, Mo., and East Ivory, Ill.; Moro, Ill., and Little Rock Landing, Mo.; Cairo, Ill., and Bird Point, Mo.; Columbus, Ky., and Belmont, Mo.; Memphis, Tenn., and Hopefield, Ark.; Helena, Ark., and Trotters Point, Miss.; Vicksburg, Miss., and Delta Point, La.; Natchez, Miss., and Vidalia, La.; New Orleans and Gouldsboro, La.; and New Orleans and Algiers, Louisiana.

The general statistics are presented in Table 47.

TABLE 47.—*Craft operated in connection with steam railroads, by class: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels	38	24	14
Gross tonnage	21,206	10,480	10,726
Value of vessels	$1,231,895	$1,009,154	$222,741
Number of employees	261	255	6
Wages	$192,201	$188,601	$3,600
Number of passengers carried	[1] 371,514	371,514	.....

[1] Includes 21,232 passengers carried on towboats.

Passengers were reported as carried at the following car transfer points: At New Orleans, La.; between Natchez, Miss., and Vidalia, La.; Vicksburg, Miss., and Delta Point, La.; Helena, Ark., and Trotters Point, Miss.; Columbus, Ky., and Belmont, Mo.; Cairo, Ill., and Bird Point, Mo.; Brookport, Ill., and Paducah, Ky.; and Gunters Landing and Hobbs Island, Alabama.

Table 48 presents the details of the vessel equipment for this service, and the freight handled.

In a number of cases the reports showed the number of loaded cars ferried, and in two cases the 99,825 cars ferried included loaded and empty cars. For the latter cases it has been estimated that the loaded cars formed 80 per cent of the cars transferred, and the freight handled has been estimated at 20 tons per car. On this basis there were 3,770,340 tons of freight transferred in 188,517 loaded cars, in addition to the 3,135,257 tons of freight directly reported. On the basis of 20 tons per car for the freight directly reported there is obtained an estimated total of 345,280 loaded cars for all car freight.

TABLE 48.—*Craft operated in connection with steam railroads, by river systems: 1906.*

	Total.	Ohio system.	Lower Mississippi system.
Number of vessels	38	9	29
Gross tonnage	21,206	2,887	18,319
Steam vessels:			
Number	24	5	19
Gross tonnage	10,480	1,427	9,053
Ferryboats—			
Number	13	2	11
Gross tonnage	8,653	974	7,679
Towboats—			
Number	11	3	8
Gross tonnage	1,827	453	1,374
Unrigged vessels:			
Number	14	4	10
Gross tonnage	10,726	1,460	9,266
Freight in cars (tons)	6,905,597	287,777	6,617,820
Reported	3,135,257	172,497	2,962,760
Estimated	3,770,340	115,280	3,655,060

GOVERNMENT VESSELS.

State and city.—The general statistics for the vessels owned and operated by state and city governments are given in Table 49.

TABLE 49.—*Vessels owned and operated by state and city governments: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels	8	4	4
Gross tonnage	873	375	498
Value of vessels	$80,200	$59,700	$20,500
Gross income	$7,000	$1,000	$6,000
Number of employees	15	15	.....
Wages	$11,300	$11,300	.....
Number of passengers carried	5,000	5,000	.....

These vessels were employed as follows: One steamer in ferry service in Minnesota, 1 steamer for the protection of game by the state of Illinois, 1 steamer in quarantine duty and 3 barges for the disposal of garbage at New Orleans, and 1 steamer and 1 barge in harbor work at St. Louis.

Federal.—The United States Government has a large number of vessels in service on the Mississippi river and its tributaries, chiefly in connection with the various improvements to the channels and harbors under the direction of the Engineer Department of the United States Army. These vessels are not included elsewhere in this report.

In 1906 there were in the service of the Engineer Department 361 vessels of 5 tons register or over, comprising steamboats, tenders, launches, towboats, snag boats, dredges of different types—hydraulic, pump and suction, dipper, ladder, etc.—derrick boats, pile drivers, quarter boats, repair boats, barges, scows, and flats.

This is inclusive of the boats of the New Orleans station employed in the improvements at the Mississippi river passes.

The manner of reporting the tonnage is not uniform for all vessels, gross tonnage being reported in some cases and net tonnage or displacement tonnage in others, and in a few cases no data as to the tonnage. The tonnage reported for 341 vessels aggregates 72,411 tons. Vessels of the steamer class, including all vessels equipped with propelling power, numbered 126; the tonnage of 6 of these was not reported, but 120 reported a tonnage of 23,693.

Horsepower was reported in the case of 83 vessels, with a tonnage of 19,321. Of these vessels, 78 were steam vessels of 25,034 horsepower and 5 were gasoline boats of 74 horsepower.

The value of all Federal craft on the Mississippi river and its tributaries, with the exception of 2 unrigged craft for which the value was not reported, was $5,438,226, which amount forms 23.8 per cent of the value of all commercial craft.

The Federal fleet in 1906 included 32 dredges of all kinds, valued at $2,548,070, and 12 snag boats, valued at $529,618. Five of the vessels of 841 tons are of iron construction, 60 vessels of 20,045 tons are of steel construction, 6 of 1,368 tons are composite, 3 of 699 tons are iron and steel, and 287 are wooden vessels. For 95 of the self-propelling vessels the classification by means of propulsion is as follows: Stern wheels, 78; side wheels, 7; and screw propellers, 10.

The Bureau of Fisheries, Department of Commerce and Labor, had 1 wooden steam vessel of a gross tonnage of 50 and a value of $7,434 on the Mississippi river, and the Light-House Service, 3 steam tenders of a gross tonnage of 1,312 and a value of $111,400. Of the latter boats, 2 are of steel construction and 1 of wood; and 2 are stern wheel boats and 1 is side wheel.

FISHING CRAFT.

The number, tonnage, and value of vessels engaged in the commercial fisheries, as reported by the Bureau of Fisheries, and the number of persons employed on such vessels, are given in the following statement, the figures being for 1903, the last year for which statistics are available:

Vessels engaged in commercial fisheries: 1903.

Number of transporting vessels	5
Net tonnage	138
Value of vessels	$11,400
Number of persons employed	19

IDLE VESSELS.

Table 50 gives the statistics in regard to idle vessels which are not included in the foregoing tables.

TABLE 50.—*Idle vessels: 1906.*

	Total.	Steam.	Unrigged.
Number of vessels	171	100	71
Gross tonnage	15,038	4,482	10,556
Net tonnage	14,564	4,009	10,555
Value of vessels	$310,685	$256,220	$54,465
Construction:			
Iron	2	2	.....
Steel	2	2	.....
Wood	166	95	71
Composite	1	1	.....
Character of propulsion:			
Stern wheel	58	58	.....
Side wheel	5	5	.....
Screw	36	36	.....
All other	1	1	.....
Horsepower of engines	7,325	7,325	.....
Steam	6,407	6,407	.....
Gasoline	918	918	.....

The idle steam vessels constituted 6.5 per cent of the number of all steam vessels, active and idle, 3 per cent of the tonnage, and 1.9 per cent of the value; while of the unrigged craft, the idle boats formed nine-tenths of 1 per cent of the number of all unrigged craft, two-tenths of 1 per cent of the tonnage, and six-tenths of 1 per cent of the value.

In 1889 the idle steam vessels, or steam vessels for which no traffic report was received, were 138 in number; they had a tonnage of 17,364 and were valued at $902,643. The proportion these vessels formed of all steam vessels amounted to 12.4 per cent for number, 8.3 per cent for tonnage, and 8.6 per cent for value.

CONGRESSIONAL APPROPRIATIONS.

There are between fifteen and sixteen thousand miles of navigable waterways in the Mississippi valley, and for the survey and improvement of the Mississippi river and its tributaries $208,063,097, or over twice as much as was shown at the Eleventh Census, has been appropriated by Congress up to and including the act of March 2, 1907.[1] Whatever differences exist between the figures shown in 1890 and those for the same periods as shown in this report are due to a reclassification of the streams or localities improved, to a readjustment of some of the appropriations, or to apparent errors made in 1890. The earliest appropriation was made in 1809, when Congress authorized the expenditure of $25,000 for the purpose of extending the Carondelet canal to the Mississippi river.

Table 51 shows the amounts appropriated by Congress for the survey, improvement, and maintenance of the waterways of the Mississippi valley, by systems and by periods.

Of the total amount appropriated, 33.1 per cent was for the specific improvement of the waterways of the Upper Mississippi system, 31.4 per cent for the

[1] Not including $421,623 appropriated for the Red River (of the North) and for Warroad harbor and river.

Ohio system, 33.2 per cent for the Lower Mississippi system, and 2.3 per cent for general improvements. Of the total, 59.6 per cent has been appropriated since 1890.

TABLE 51.—*Congressional appropriations for the survey, improvement, and maintenance of the tributary streams and harbors of the Mississippi river, by periods and river systems.*[1]

RIVER SYSTEM.	APPROPRIATIONS.			
	Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	$208,063,097	$83,993,783	$115,268,431	$8,800,883
Upper Mississippi	68,802,507	31,283,508	35,994,999	1,524,000
Ohio	65,433,649	24,641,220	37,351,826	3,440,603
Lower Mississippi	69,118,561	23,360,675	41,921,606	3,836,280
General	4,708,380	4,708,380	.....	.....

[1] Does not include appropriations for the improvements at mouth of the Mississippi river, for which see section on Atlantic coast and Gulf of Mexico.

From Table 52, which shows the Congressional appropriations for each stream or locality, it will be seen, as is to be expected, that the largest appropriations have been made for the survey, improvement, and maintenance of the Mississippi river.

The total appropriations for the Mississippi river aggregate $97,685,920, or a little less than one-half of the total amount appropriated for the waterways of the valley. Of the amount shown for the Mississippi river, 59.4 per cent was for the improvement of the lower part of the river, which is the portion between the mouth of the Ohio river and Head of Passes below New Orleans. This amount includes not only the appropriations for such work as snagging, dredging, and the removal of wrecks, but also those for levee work and other improvements at various specified localities. The appropriations for the betterments at the mouth of the Mississippi river are included in the section relating to the Atlantic coast and Gulf of Mexico. In the case of the Upper Mississippi, which extends from the headwaters of the river to the mouth of the Ohio, the total appropriations cover not only those for the improvement and maintenance of the channel, but also those for the construction of reservoirs at the headwaters of this river, as well as those for the improvements at the Des Moines rapids and other specific localities.

The next largest appropriations have been made for the Ohio river, for the improvement of which Congress has authorized the expenditure of over $25,000,000. The expenditures have been not only for general open channel improvement and snag boat work, but also for the construction of locks and dams. It is the intention to ultimately canalize this river from Pittsburg to its mouth by the construction of sufficient locks and dams to afford either a 6-foot or a 9-foot depth the entire length of the river. The cost of the canal around the Falls of the Ohio at Louisville, Ky., which amounts to nearly $6,000,000, is included in the total for the Ohio river.

TABLE 52.—CONGRESSIONAL APPROPRIATIONS FOR THE SURVEY, IMPROVEMENT, AND MAINTENANCE OF THE TRIBUTARY STREAMS AND HARBORS OF THE MISSISSIPPI RIVER, BY PERIODS AND LOCALITIES.

RIVER SYSTEM AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Aggregate	1809	$208,063,097	$83,993,783	$115,268,431	$8,800,883
Upper Mississippi system	1836	68,802,507	31,283,508	35,994,999	1,524,000
Mississippi river headwaters to mouth of Ohio river[1]	1836	39,677,513	18,289,908	20,492,605	895,000
Mississippi river to Lake Superior (survey)	1894	10,000	.....	10,000	.....
Big Stone Lake and Lake Traverse, Minn. and S. Dak.	1899	5,000	.....	5,000	.....
Chippewa river, Wis.	1876	201,750	166,750	35,000	.....
Cuivre river, Mo.	1880	12,000	12,000	.....	.....
Des Moines and Iowa rivers, Iowa	1839	1,000	1,000	.....	.....
Fox and Wisconsin rivers, Wis.	1839	[2]5,050,711	[2]3,740,936	1,274,775	35,000
Galena river, Ill.	1878	236,102	166,000	70,102	.....
Gasconade river, Mo.	1880	111,500	46,500	55,000	10,000
Illinois river, Ill.	1852	2,377,779	1,773,827	503,952	100,000
Illinois and Des Plaines rivers, Ill.	1899	230,000	.....	230,000	.....
Illinois and Mississippi canal, Ill.[4]	1882	7,578,179	545,000	7,033,179	.....
Kaskaskia river, Ill.[5]	1890	10,500	6,000	4,500	.....
Lake Minnetonka, Minn.	1905	7,000	.....	7,000	.....
Milwaukee and Rock River canal, Wis. and Ill.	1864	225,277	225,277	.....	.....
Minnesota river, Minn.	1867	137,500	127,500	8,000	2,000
Missouri river	1836	11,851,060	5,701,060	[6]5,750,000	400,000
Osage river, Mo.	1871	801,021	260,000	463,021	78,000
Red Cedar river, Iowa	1839	1,500	1,500	.....	.....
Rock river, Wis. and Ill.	1838	1,000	1,000	.....	.....
St. Croix river, Minn. and Wis.	1878	147,365	100,500	42,865	4,000
Yellowstone river, Mont. and N. Dak.	1879	128,750	118,750	10,000	.....

[1] Includes operations of snag and dredge boats.
[2] Includes $143,000 shown under Great Lakes in 1890, also payments connected with flowage damages.
[3] Includes payments connected with flowage damages.
[4] Called Hennepin canal in 1890.
[5] Included under Lower Mississippi system in 1890.
[6] Includes $50,000 contributed by citizens of St. Joseph, Mo.

TABLE 52.—CONGRESSIONAL APPROPRIATIONS FOR THE SURVEY, IMPROVEMENT, AND MAINTENANCE OF THE TRIBUTARY STREAMS AND HARBORS OF THE MISSISSIPPI RIVER, BY PERIODS AND LOCALITIES—Continued.

RIVER SYSTEM AND LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Ohio system	1826	65,433,649	24,641,220	37,351,826	3,440,603
Ohio river	1826	25,340,547	10,746,087	12,815,494	1,778,966
Ohio river to Lake Erie canal (survey)	1894	20,000		20,000	
Allegheny river	1879	2,011,484	287,500	1,488,984	235,000
Big Sandy river, W. Va. and Ky	1878	1,458,535	301,500	1,050,035	107,000
Buckhannon river, W. Va	1884	5,500	5,500		
Caney Fork river, Tenn	1880	28,000	25,000		3,000
Cheat river, W. Va	1890	13,000	13,000		
Clinch river, Tenn	1880	54,500	35,000	19,500	[1]
Cumberland river, Tenn. and Ky	1832	3,561,000	1,343,000	2,068,000	150,000
Duck river, Tenn	1880	13,000	13,000		
Elk river, Tenn. and Ala	1899	4,000		4,000	
Elk river, W. Va	1878	30,500	24,000	6,500	
French Broad and Little Pigeon rivers, Tenn	1876	142,000	91,000	49,000	2,000
Gauley river, W. Va	1888	15,000	6,000	9,000	
Green and Barren rivers, Ky	1888	1,882,923	495,005	1,387,918	
Guyandotte river, W. Va	1878	22,500	16,500	6,000	
Hiwassee river, Tenn	1876	107,625	36,500	14,500	[2] 56,625
Holston river, Tenn	1902	5,000		5,000	[1]
Kanawha river, W. Va	1873	5,000,642	2,806,397	2,194,245	
Kentucky river, Ky	1879	4,588,627	1,687,704	2,800,923	100,000
Licking river, Ky	1888	16,000	6,000	10,000	
Little Kanawha river, W. Va	1876	504,476	211,175	212,301	81,000
Little Tennessee river, Tenn	1882	6,000	5,000	1,000	
Monongahela river, W. Va. and Pa	1872	9,321,546	650,351	8,415,153	256,042
Muskingum river, Ohio	1886	1,980,777	917,368	1,015,409	48,000
Obey river, Tenn	1880	11,500	11,500		
Pittsburg harbor, Pa	1899	145,663		135,663	10,000
Red river, Tenn	1881	5,000	5,000		
Rough river, Ky	1890	113,641	25,000	88,641	
Tennessee river, Tenn. and Ky	1827	8,018,626	4,043,795	3,361,861	612,970
Tradewater river, Ky	1881	16,500	16,500		
Wabash river, Ind. and Ill	1828	841,199	681,000	160,199	
Wabash and Erie canal, Ind. and Ill	1834	28,338	28,338		
White river, Ind	1879	120,000	107,500	12,500	
Lower Mississippi system	1809	69,118,561	23,360,675	41,921,606	3,836,280
Mississippi river, from mouth of the Ohio river to Head of Passes	1868	[3] 58,008,407	18,620,014	36,388,393	3,000,000
Arkansas river	1832	2,481,285	1,460,784	985,501	35,000
Bartholomew bayou, La. and Ark	1881	79,000	33,000	29,000	[4] 17,000
Big Black river, Miss	1884	15,000	10,000	5,000	
Big Hatchie river, Tenn	1880	35,500	32,000	3,500	
Big Sunflower river, Miss	1879	203,000	57,000	46,000	100,000
Black river, Ark. and Mo	1880	153,730	80,000	73,730	
Black bayou, La	1881	25,000	25,000		
Boeuf river, La	1881	65,800	31,000	34,800	[5]
Caché river, Ark	1888	20,000	7,000	11,000	2,000
Cane river, La	1884	2,500	2,500		
Carondelet canal, La	1809	25,000	25,000		
Coldwater river, Miss	1879	11,000	11,000		[6]
Current river, Ark. and Mo	1872	54,835	7,000	29,835	18,000
Cypress bayou, La. and Tex	1872	155,701	127,000	18,701	10,000
D'Arbonne and Corney bayous, La	1884	21,500	11,000	10,500	[5]
Forked Deer river, Tenn	1882	36,300	22,000	14,300	
Fourche la Fave river, Ark	1879	33,500	33,500		
L'Anguille river, Ark	1878	17,000	17,000		
Little Missouri river, Ark	1871	20,000	20,000		
Little Red river, Ark	1886	8,400	8,400		
Little river, La	1888	2,500	2,500		
Little river, Mo. and Ark	1888	8,000	8,000		
Loggy bayou, La	1884	10,000	10,000		
Obion river, Tenn	1902	30,700		27,700	3,000
Ouachita and Black rivers, Ark. and La	1871	1,367,734	351,500	815,454	200,780
Petit Jean river, Ark	1886	9,500	6,000	3,500	
Pierre bayou, La. and Miss	1884	13,600	13,600		
Red river, La., Ark., Okla., and Tex	1828	2,710,877	1,570,877	890,000	250,000
Roundaway and Vidal bayous, La	1888	2,000	2,000		
St. Francis river, Ark. and Mo	1871	136,737	58,500	66,237	12,000
Saline river, Ark	1880	21,500	21,500		
Steele and Washington bayous, Miss	1884	12,500	10,000	2,500	
Sulphur river, Ark. and Tex	1907	36,000			36,000
Tallahatchie river, Miss	1879	70,500	37,500	33,000	[6]
Tchula Lake, Miss	1881	29,000	15,000	14,000	[6]
Tensas river and Macon bayou, La	1881	52,700	21,000	31,700	[5]
Vicksburg harbor, Miss	1892	1,200,000		1,200,000	
White river, Ark	1874	1,466,255	366,500	996,255	103,500
Yalobusha river, Miss	1881	11,000	11,000		
Yazoo river, Miss	1873	455,000	215,000	191,000	[7] 49,000
General	1819	4,708,380	4,708,380		
General improvement	1820	3,867,041	3,867,041		
Dredges and snag boats	1836	550,000	550,000		
Removal of snags and wrecks	1884	280,339	280,339		
Surveys	1819	11,000	11,000		

[1] Included with appropriation for Hiwassee river.
[2] Includes appropriations for Clinch and Holston rivers.
[3] Includes removal of snags and wrecks from lower river and gauging for entire river. For appropriations relating to improvements at mouth of the Mississippi river, see section on Atlantic coast and Gulf of Mexico.
[4] Includes appropriations for Boeuf and Tensas rivers, and D'Arbonne, Corney, and Macon bayous.
[5] Included with appropriation for Bartholomew bayou.
[6] Included with appropriation for Yazoo river.
[7] Includes appropriations for Tallahatchie and Coldwater rivers, and Tchula Lake.

The Missouri river has been navigated by steamboats since 1819, but the first appropriation by Congress for its improvement was not made until 1836, since which year, however, almost $12,000,000 have been appropriated.

In 1872 the first appropriation for the improvement of the Monongahela river was made by Congress. Up to and including the act of March 2, 1907, over $9,000,000 have been appropriated for this river, and it is now canalized from Pittsburg to Fairmont, W. Va., a distance of 130 miles. Up to 1890 only about $650,000 had been appropriated.

For the improvement of the Tennessee river over $8,000,000 have been appropriated. This river and its principal tributaries form a system of internal waterways suitable for steamboat navigation for more than 1,300 miles. Included in the total appropriations for this river are those for the Muscle Shoals canal, which cost over $3,000,000.

Although the appropriation for the survey of the Illinois and Mississippi (Hennepin) canal was made in 1882, the actual work of construction was not begun until ten years later. This canal was completed late in 1907 and affords a 7-foot waterway from Lake Michigan to the Mississippi. The total appropriations for it exceed $7,000,000.

Beginning with 1873 Congressional appropriations have been made for the Kanawha river, and the river now has a navigable depth of 6 feet for all the year round. The total appropriations exceed $5,000,000.

In 1879 Congress made its first appropriation for the improvement of the Kentucky river, taking over from the state of Kentucky the locks and dams previously constructed on this stream. The appropriations to date exceed $4,500,000, and when the approved project is completed the river will be navigable for 261 miles for boats drawing 6 feet.

As early as 1832 Congress appropriated money for the improvement of the Cumberland river, which has a navigable length of 518 miles, and up to and including the act of March 2, 1907, has authorized the expenditure of over $3,500,000, the greater portion of which has been expended in canalizing this river.

Congress has appropriated over $2,000,000 each for the improvement of the Red river, the Arkansas river, the Illinois river, and the Allegheny river; and over $1,000,000 each for the Muskingum river, the Green and Barren rivers, the White river of Arkansas, the Big Sandy river, the Ouachita and Black rivers, and Vicksburg harbor.

Many of the accepted projects for the improvement of the waterways of the Mississippi valley are but partially completed, and large appropriations will be required to finish the work.

Among the many projects now before Congress relative to the improvement of the inland waterways, particular attention is being given to that which contemplates a 16-foot channel in the Mississippi river from St. Louis to its mouth. A survey has already been made and plans and estimates of cost have been submitted for a navigable waterway 14 feet deep from Lockport, Ill., by way of the Des Plaines and Illinois rivers, to the mouth of the Illinois, and thence by way of the Mississippi river to St. Louis.

Table 53 gives the detailed statistics for the transportation on the Mississippi river and its tributaries for 1906.

TABLE 53.—ALL VESSELS, BY CLASS,

	CLASS, OCCUPATION, AND OWNERSHIP.	Number of vessels.	TONNAGE.		RIGGED.				HORSEPOWER OF ENGINES.		
			Gross.	Net.	Screw.	Side wheel.	Stern wheel.	All other.	Steam.	Gasoline.	All other.
1	Aggregate	9,622	4,411,967	4,379,064	356	85	990	4	227,802	9,167	.....
2	Steam	1,435	146,227	129,227	356	85	990	4	227,802	9,167	.....
3	Freight and passenger	390	55,779	49,997	67	36	287	.....	78,451	2,241	.....
4	Tugs and other towing vessels	619	62,836	53,821	106	7	506	.....	114,696	2,851	.....
5	Ferryboats	166	22,180	20,791	22	35	105	4	27,372	848	.....
6	Yachts	222	3,255	2,923	146	6	70	.....	3,571	2,971	.....
7	All other	38	2,177	1,695	15	1	22	.....	3,712	256	.....
8	Individual	687	27,524	24,268	238	24	424	1	36,174	6,403	.....
9	Freight and passenger	179	11,472	10,379	49	10	120	.....	14,718	1,408	.....
10	Tugs and other towing vessels	232	10,441	8,834	40	3	189	.....	15,475	1,859	.....
11	Ferryboats	73	2,349	2,174	17	6	49	1	2,068	481	.....
12	Yachts	185	2,815	2,506	122	5	58	.....	2,873	2,444	.....
13	All other	18	447	375	10	.....	8	.....	1,040	211	.....
14	Firm	211	11,360	10,376	49	10	152	.....	17,412	1,395	.....
15	Freight and passenger	71	5,822	5,412	11	4	56	.....	8,005	462	.....
16	Tugs and other towing vessels	85	3,944	3,600	16	1	68	.....	7,823	444	.....
17	Ferryboats	27	1,384	1,171	1	5	21	.....	1,171	193	.....
18	Yachts	26	183	167	20	.....	6	.....	398	286	.....
19	All other	2	27	26	1	.....	1	.....	15	10	.....
20	Incorporated company	524	106,575	93,892	66	48	407	3	173,051	1,194	.....
21	Freight and passenger	139	38,243	33,964	7	22	110	.....	55,595	371	.....
22	Tugs and other towing vessels	298	48,351	41,309	50	3	245	.....	91,328	490	.....
23	Ferryboats	65	18,403	17,402	4	23	35	3	24,117	174	.....
24	Yachts	7	206	204	3	.....	4	.....	300	139	.....
25	All other	15	1,372	1,013	2	.....	13	.....	1,711	20	.....
26	Miscellaneous	13	768	691	3	3	7	.....	1,165	175	.....
27	Freight and passenger	1	242	242	.....	.....	1	.....	133	.....	.....
28	Tugs and other towing vessels	4	100	78	.....	.....	4	.....	70	58	.....
29	Ferryboats	1	44	44	.....	1	.....	.....	16	.....	.....
30	Yachts	4	51	46	1	1	2	.....	.....	102	.....
31	All other	3	331	281	2	1	.....	.....	946	15	.....
32	Unrigged	8,187	4,265,740	4,249,837	.....	.....	.....	.....	.....	.....	.....
33	Individual	631	107,131	107,000	.....	.....	.....	.....	.....	.....	.....
34	Firm	322	37,986	37,986	.....	.....	.....	.....	.....	.....	.....
35	Incorporated company	7,228	4,120,025	4,104,253	.....	.....	.....	.....	.....	.....	.....
36	Miscellaneous	6	598	598	.....	.....	.....	.....	.....	.....	.....

OCCUPATION, AND OWNERSHIP: 1906.

CONSTRUCTION.				Value of vessels.	INCOME.			Number of employees.	Wages.	Number of passengers carried.	Freight carried (net tons).	
Iron	Steel	Wood.	Composite.		Freight.	Passengers.	All other.					
26	81	9,513	2	$22,852,142	$7,450,869	$2,281,243	$7,609,926	15,016	$5,692,117	14,122,241	19,531,093	1
25	50	1,358	2	13,196,770	6,480,655	2,279,998	6,649,483	13,973	5,148,581	13,890,850	2,355,386	2
1	9	379	1	3,737,450	4,038,002	1,766,581	130,046	6,746	2,019,202	3,808,850	2,305,867	3
18	22	578	1	6,822,210	2,442,653	14,535	4,953,055	6,109	2,512,108	58,688	49,519	4
3	10	153	.....	1,776,360	.....	498,747	1,054,374	699	413,553	10,022,612	.....	5
2	9	211	.....	563,400	.....	135	1,988	165	59,168	700	.....	6
1	.....	37	.....	297,350	.....	.....	510,020	254	144,550	.....	.....	7
5	13	669	.....	2,394,680	1,202,363	530,028	1,119,643	2,942	962,389	2,580,811	426,640	8
1	5	173	.....	778,125	858,539	410,741	51,807	1,541	409,785	1,233,001	419,209	9
2	2	228	.....	847,405	343,824	7,573	870,040	1,046	390,835	32,353	7,431	10
.....	1	72	.....	206,100	.....	111,579	97,217	155	75,241	1,314,757	.....	11
2	5	178	.....	502,450	.....	135	1,882	140	50,545	700	.....	12
.....	.....	18	.....	60,600	.....	.....	98,697	60	35,983	.....	.....	13
.....	7	204	.....	935,875	660,642	251,202	305,763	1,210	465,025	953,673	246,262	14
.....	1	70	.....	402,400	451,902	209,183	13,570	703	252,375	443,973	232,407	15
.....	1	84	.....	407,825	208,740	4,722	244,485	443	181,870	4,706	13,855	16
.....	1	26	.....	90,950	.....	37,297	46,577	57	28,805	505,000	.....	17
.....	4	22	.....	33,200	.....	.....	106	7	1,975	.....	.....	18
.....	.....	2	.....	1,500	.....	.....	1,025	.....	.....	.....	.....	19
19	30	473	2	9,763,915	4,578,648	1,498,179	5,220,019	9,743	3,691,619	10,351,318	1,666,759	20
.....	3	135	1	2,550,925	2,692,204	1,146,568	64,169	4,455	1,342,364	2,131,828	1,638,526	21
16	19	262	1	5,559,980	1,886,444	2,240	3,835,472	4,606	1,936,183	21,635	28,233	22
3	8	54	.....	1,477,310	.....	349,371	910,080	486	309,307	8,197,855	.....	23
.....	.....	7	.....	18,150	.....	.....	.....	16	6,298	.....	.....	24
.....	.....	15	.....	177,550	.....	.....	410,298	180	97,467	.....	.....	25
1	.....	12	.....	82,300	39,002	589	4,058	78	29,548	5,048	15,725	26
.....	.....	1	.....	6,000	35,357	89	500	47	14,678	48	15,725	27
.....	.....	4	.....	7,000	3,045	.....	3,058	14	3,220	.....	.....	28
.....	.....	1	.....	2,000	.....	500	500	1	200	5,000	.....	29
.....	.....	4	.....	9,600	.....	.....	.....	2	350	.....	.....	30
1	.....	2	.....	57,700	.....	.....	.....	14	11,100	.....	.....	31
1	31	8,155	.....	9,655,372	970,214	1,245	960,443	1,043	543,536	231,391	17,175,707	32
.....	.....	631	.....	720,075	234,498	1,095	78,851	190	76,174	13,000	1,874,323	33
.....	1	321	.....	406,026	84,396	150	225,094	193	99,335	20,381	560,973	34
1	30	7,197	.....	8,508,271	651,320	.....	650,498	660	368,027	198,010	14,736,361	35
.....	.....	6	.....	21,000	.....	.....	6,000	.....	.....	.....	4,050	36

CANALS AND OTHER INLAND WATERS

CANALS AND OTHER INLAND WATERS.

By WILLIAM A. COUNTRYMAN.

The statistics in this section relate to transportation by all vessels, documented and undocumented, of 5 tons net register or over, on all canals except ship canals, save that the Chicago Drainage and Ship canal is included; on all lakes except the Great Lakes; on all rivers, canalized or other, tributary to the Great Lakes, but not on any river tributary to the Mississippi; on the Red River (of the North); and above tidewater on all rivers tributary to the Atlantic and Pacific oceans and the Gulf of Mexico.

TABLE 1.—ALL VESSELS AND CRAFT: 1906.

[In addition to the craft reported in this table there were 68 vessels, with a gross tonnage of 7,368 reported as idle in 1906.]

	AGGREGATE.			STEAM.[1]			SAIL.			UNRIGGED.		
	Total.	Canals and other inland waters of New York state.	All other inland waters.	Total.	Canals and other inland waters of New York state.	All other inland waters.	Total.	Canals and other inland waters of New York state.	All other inland waters.	Total.	Canals and other inland waters of New York state.	All other inland waters.
Number of vessels	2,140	1,648	492	337	151	186	14	13	[2] 1	1,789	1,484	305
Gross tonnage	259,491	209,152	50,339	21,507	14,127	7,380	518	495	23	237,466	194,530	42,936
Value of vessels	$4,586,791	$3,294,221	$1,292,570	$2,225,673	$1,390,512	$835,161	$16,800	$16,000	$800	$2,344,318	$1,887,709	$456,609
Gross income	$3,957,729	$2,781,604	$1,176,125	$1,065,469	$525,970	$539,499	$4,250	$4,250	.....	$2,888,010	$2,251,384	$636,626
Number of employees	3,731	2,472	1,259	1,153	590	563	11	11	.....	2,567	1,871	696
Wages	$1,361,030	$920,260	$440,770	$412,134	$192,238	$219,896	$1,620	$1,620	.....	$947,276	$726,402	$220,874
Number of passengers carried	1,877,889	835,052	1,042,837	1,871,769	828,932	1,042,837	.....	.....	.....	6,120	6,120	.....
Freight carried, including harbor work (net tons)[3]	3,944,655	2,712,481	1,232,174	261,315	105,498	155,817	6,968	6,968	.....	3,676,372	2,600,015	1,076,357

[1] Includes all craft propelled by machinery.
[2] A pleasure yacht.
[3] Harbor work amounted to 227,890 tons, of which 1,500 tons were reported for steam vessels and 208,090 for unrigged on canals and other inland waters of New York state, and 18,300 tons for unrigged vessels on all other inland waters.

In only a few particulars can the statistics for 1906 and 1889 be compared. At the earlier census separate reports were made for transportation on canals and canalized rivers and for transportation on Lake Champlain; statistics for the Red River (of the North) were shown separately among the statistics for rivers of the Mississippi valley; statistics for freight traffic, except on Lake Champlain and the Red River (of the North), were reported by the management of the canals, and not by the boat owners as in 1906. The income and expenses also were those of the canal companies and not those of the boat owners; and no returns of employees or wages for canals and canalized rivers were given. The only comparison possible is with the number, tonnage, and valuation of canal boats, and the average value and tonnage.

TABLE 2.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CLASS: 1906 AND 1889.

	TOTAL.			STEAM.			SAIL.			UNRIGGED.		
	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.	1906	1889	Per cent of increase.
Number of vessels	2,140	6,575	[1] 67.5	337	163	106.7	14	25	[1] 44.0	1,789	6,387	[1] 72.0
Gross tonnage	259,491	996,629	[1] 74.0	21,507	19,223	11.9	518	1,925	[1] 73.1	237,466	975,481	[1] 75.7
Value of vessels	$4,586,791	$6,138,914	[1] 25.3	$2,225,673	$790,000	181.7	$16,800	$36,800	[1] 54.3	$2,344,318	$5,312,114	[1] 55.9

[1] Decrease.

In the statistics of transportation on Lake Champlain for 1889 there are more details that could be compared with those of 1906, if a separate showing of the traffic on this lake were practicable for the later census. The details for the Red River (of the North) do not include the operations of 11 unrigged vessels; for these, only tonnage and value are given.

The increase in boats operated by steam and the

decrease in all other kinds represent the tendency in transportation on inland waterways. The unrigged boats decreased in number very materially, although they still outnumbered the steam vessels. In value the two classes were, as a whole, about the same in 1906; in tonnage, however, there was a wide difference in favor of the unrigged craft, which leads to the conclusion that the increase in steam craft on inland waters is due to their use for towing, for excursions, and as private yachts for pleasure. Since 1889 yachts have been used not only on rivers and lakes, but also on canals. The superintendent of public works of the state of New York in his report on canals for the year 1905 states that "formal written navigation permits were issued the past year to the owners of nearly one thousand such pleasure craft."[1] Many of these, however, probably had a net tonnage of less than 5, and consequently were not enumerated for 1906.

Of the steam vessels, 84, with a gross tonnage of 7,280, were operated on canals.

The decrease in number of unrigged boats is very largely due to the decrease of canal boats operating on the canals of New York state. The superintendent of public works, in his annual report on canals for the year 1906, states that "a total of ten million tons of freight could have been carried on the canals but for the single fact—a total inadequacy of seaworthy boats. There has been a constant decrease in the number of boats annually constructed during the past twelve years, and during the past five years the number of boats added to the equipment has not exceeded from six to ten in any one year. On the other hand, the older craft have been rapidly going out of commission. A careful inspection of the boats navigating the canals during the past season would have shown a very large number of those in commission so dilapidated as not to be accepted as risks by the marine insurance companies."[2] The freight carrying craft on all canals in the state in 1905 did not exceed 600 in number.[3] Another reason for the decrease in the number of canal boats is the abandonment since 1889 of several towpath canals, thus lessening the demand.

[1] Report on Canals of Superintendent of Public Works of the State of New York, 1905, page 16.
[2] Ibid., 1906, page 6.
[3] Ibid., 1905, page 16.

Of the total number of vessels, 1,429, having a tonnage of 188,231, were undocumented. Of these, 191, with a tonnage of 9,275, were operated by steam, and 4, with a tonnage of 25, by sail; while 1,234, with a tonnage of 178,931, were unrigged craft.

In addition to the number of the vessels for which statistics are shown in the statistical tables of this report, 68 were reported as idle during the year.

TABLE 3.—*Idle vessels: 1906.*

CLASS.	TOTAL.		DOCUMENTED.		UNDOCUMENTED.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	68	7,368	15	692	53	6,676
Steam	18	651	10	311	8	340
Sail	1	10	.....	.....	1	10
Unrigged	49	6,707	5	381	44	6,326

Over four-fifths of the boats operated upon inland waters were unrigged craft, mostly canal boats, and their gross tonnage was more than nine-tenths of the gross tonnage shown, although their value was but a little more than one-half of the value of all vessels.

TABLE 4.—*Per cent that steam, sail, and unrigged vessels form of total: 1906.*

	Steam.	Sail.	Unrigged.
Number of vessels	15.7	0.7	83.6
Gross tonnage	8.3	0.2	91.5
Value of vessels	48.5	0.4	51.1
Gross income	26.9	0.1	73.0
Number of employees	30.9	0.3	68.8
Wages	30.3	0.1	69.6
Number of passengers carried	99.7	.....	0.3
Freight carried, including harbor work (net tons)	6.6	0.2	93.2

Nearly three-fourths of the gross income and over two-thirds of the employees and wages were reported by these unrigged craft. Their passenger traffic was small, the steam vessels reporting all but three-tenths of 1 per cent of all passengers carried. Practically all the freight was carried by the unrigged craft; the sailing vessels had only two-tenths of 1 per cent of it and the steam vessels only 6.6 per cent.

TABLE 5.—PER CENT THAT CANALS AND OTHER INLAND WATERS OF NEW YORK STATE, AND ALL OTHER INLAND WATERS, FORM OF TOTAL, FOR ALL VESSELS AND FOR EACH CLASS: 1906.

	AGGREGATE.		STEAM.		SAIL.		UNRIGGED.	
	Canals and other inland waters of New York state.	All other inland waters.	Canals and other inland waters of New York state.	All other inland waters.	Canals and other inland waters of New York state.	All other inland waters.	Canals and other inland waters of New York state.	All other inland waters.
Number of vessels	77.0	23.0	44.8	55.2	92.9	7.1	83.0	17.0
Gross tonnage	80.6	19.4	65.7	34.3	95.6	4.4	81.9	18.1
Value of vessels	71.8	28.2	62.5	37.5	95.2	4.8	80.5	19.5
Gross income	70.3	29.7	49.4	50.6	100.0	.....	78.0	22.0
Number of employees	66.3	33.7	51.2	48.8	100.0	.....	72.9	27.1
Wages	67.6	32.4	46.6	53.4	100.0	.....	76.7	23.3
Number of passengers carried	44.5	55.5	44.3	55.7	.....	.....	100.0	.....

For all but the operations of steam vessels the totals for craft on inland waters of New York had a very marked superiority over the totals for the craft on all other inland waters. Of the 2,140 vessels of all kinds reported, 1,648, or 77 per cent, were operated on the inland waters of New York. Of the different kinds, New York state reported 44.8 per cent of the steam, 92.9 per cent of the sail, and 83 per cent of the unrigged.

Of steam vessels on the New York canals, 22, with a gross tonnage of 1,552 and a value of $169,400, were used for towing. Of those on the canals of all other states, 5, with a gross tonnage of 140 and a value of $22,700, were used for the like purpose. The chief income of the New York steam vessels operating on canals—$122,946, or 53.4 per cent of the total amount reported by them—was from "all other sources;" and of this, all but $12,450 was reported by towboats. The greatest income of steam craft on canals in all other states was from the transportation of freight.

TABLE 6.—*Steam vessels operating on canals of New York state, and of all other states: 1906.*

	Total.	New York state.	All other states.
Number of vessels	84	64	20
Gross tonnage	7,280	5,757	1,523
Value of vessels	$418,800	$311,000	$107,800
Gross income	$370,101	$230,085	$140,016
Freight	$189,391	$92,325	$97,066
Passengers	$23,616	$14,814	$8,802
All other sources	$157,094	$122,946	$34,148
Number of employees	362	255	107
Wages	$145,701	$91,941	$53,760
Freight carried (net tons)	189,522	85,534	103,988

Nearly the entire number of vessels operating on the inland waters of the United States were used for commercial purposes, and more than four-fifths were unrigged craft. Except in value, all percentages shown for the commercial vessels were even greater than the percentage their number was of the whole.

TABLE 7.—ALL VESSELS AND CRAFT, BY OCCUPATION, AND PER CENT IN EACH GROUP: 1906.

OCCUPATION.	VESSELS.		TONNAGE.		VALUE OF VESSELS.		GROSS INCOME.		EMPLOYEES.		WAGES.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.	Amount.	Per cent.	Number.	Per cent.	Amount.	Per cent.
Total	2,140	100.0	259,491	100.0	$4,586,791	100.0	$3,957,729	100.0	3,731	100.0	$1,361,030	100.0
Commercial vessels	2,039	95.3	257,309	99.2	4,076,269	88.9	3,934,632	99.4	3,599	96.5	1,317,275	96.8
Freight and passenger	170	7.9	16,903	6.5	1,283,987	28.0	713,020	18.0	737	19.8	237,830	17.5
Ferryboats	5	0.2	307	0.1	86,500	1.9	35,150	0.9	17	0.5	8,154	0.6
Tugs and other towing vessels	75	3.5	2,733	1.1	361,464	7.9	298,452	7.5	278	7.5	124,015	9.1
Unrigged craft	1,789	83.6	237,466	91.5	2,344,318	51.1	2,888,010	73.0	2,567	68.8	947,276	69.6
Yachts	85	4.0	1,476	0.6	474,872	10.4	640	(1)	100	2.7	31,891	2.3
All other	16	0.7	706	0.3	35,650	0.8	22,457	0.6	32	0.9	11,864	0.9

[1] Less than one-tenth of 1 per cent.

The few vessels reported besides those classified as commercial, were yachts used for pleasure, and "all other" kinds of vessels, which class was made up of craft used for the inspection, repair, and care of rivers and canals, and craft for pleasure and other purposes.

NUMBER AND TONNAGE OF VESSELS.

The limit of gross tonnage per vessel of all kinds was in the group of vessels having from 1,000 to 2,499 tons. In this group there were 4 vessels, divided between steam and unrigged craft; and they were all employed in New York waters. For "all other inland waters" the limit was in the group of vessels of from 400 to 499 tons. The largest number of vessels of all kinds was in the group having from 100 to 199 tons, and the next, in that having from 5 to 49. Most of the steam vessels—66.5 per cent—had a gross tonnage of from 5 to 49 tons; the largest proportion of unrigged craft—73.2 per cent—was reported in the 100 to 199 group.

"All other inland waters" exceeded "canals and other inland waters of New York state" in number of steam and unrigged vessels in the lowest tonnage group. The only sail vessel reported for "all other inland waters" was also in this group.

TABLE 8.—VESSELS GROUPED ACCORDING TO GROSS TONNAGE: 1906.

DIVISION AND CLASS.	TOTAL.		5 TO 49 TONS.		50 TO 99 TONS.		100 TO 199 TONS.		200 TO 299 TONS.		300 TO 399 TONS.		400 TO 499 TONS.		500 TO 999 TONS.		1,000 TO 2,499 TONS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	2,140	259,491	271	5,184	255	20,505	1,371	164,817	187	43,435	32	11,002	13	5,319	7	4,634	4	4,595
Steam	337	21,507	224	4,041	41	2,980	59	7,681	6	1,440	2	667	1	469	2	1,634	2	2,595
Sail	14	518	10	126	2	183	2	209										
Unrigged	1,789	237,466	37	1,017	212	17,342	1,310	156,927	181	41,995	30	10,335	12	4,850	5	3,000	2	2,000
Canals and other inland waters of New York state	1,648	209,152	105	1,990	193	16,244	1,153	136,313	174	40,676	1	300	11	4,400	7	4,634	4	4,595
Steam	151	14,127	80	1,523	17	1,145	45	5,924	4	1,006	1	300			2	1,634	2	2,595
Sail	13	495	9	103	2	183	2	209										
Unrigged	1,484	194,530	16	364	174	14,916	1,106	130,180	170	39,670			11	4,400	5	3,000	2	2,000
All other inland waters	492	50,339	166	3,194	62	4,261	218	28,504	13	2,759	31	10,702	2	919				
Steam	186	7,380	144	2,518	24	1,835	14	1,757	2	434	1	367	1	469				
Sail	1	23	1	23														
Unrigged	305	42,936	21	653	38	2,426	204	26,747	11	2,325	30	10,335	1	450				

OWNERSHIP OF VESSELS.

Nearly two-thirds of the number and tonnage of all craft used for purposes of transportation on all inland waters of the country were under individual ownership. Incorporated companies were next most extensive in their ownership.

All the sailing vessels belonged to individuals. When the steam and unrigged are considered, a greater proportion of the latter than of the former is found to have been owned by individuals, although the difference is not great.

TABLE 9.—*Number, gross tonnage, and value of vessels, by character of ownership, with per cent in each class: 1906.*

OWNERSHIP.	VESSELS.		TONNAGE.		VALUE OF VESSELS.	
	Number.	Per cent.	Gross tons.	Per cent.	Amount.	Per cent.
Total	2,140	100.0	259,491	100.0	$4,586,791	100.0
Individual	1,328	62.1	160,359	61.8	2,320,100	50.6
Firm	83	3.9	7,993	3.1	125,200	2.7
Incorporated company	696	32.5	88,331	34.0	2,064,641	45.0
Miscellaneous	33	1.5	2,808	1.1	76,850	1.7

TABLE 10.—NUMBER AND GROSS TONNAGE OF VESSELS, BY CHARACTEP OF OWNERSHIP AND BY OCCUPATION: 1906.

CLASS AND OCCUPATION.	TOTAL.		INDIVIDUAL.		FIRM.		INCORPORATED COMPANY.		MISCELLANEOUS.	
	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.	Number of vessels.	Gross tonnage.
Total	2,140	259,491	1,328	160,359	83	7,993	696	88,331	33	2,808
Steam	337	21,507	191	8,557	22	858	114	11,098	10	394
Freight and passenger	166	16,477	85	6,046	12	618	66	9,577	3	236
Tugs and other towing vessels	75	2,733	28	1,035	5	59	38	1,519	4	120
Ferryboats	5	307			1	5	4	302		
Yachts	75	1,284	69	1,226	2	15	2	19	2	24
All other	16	706	9	250	2	161	4	281	1	14
Sail	14	518	14	518						
Freight and passenger	4	326	4	326						
Yachts	10	192	10	192						
Unrigged	1,789	237,466	1,123	151,284	61	7,135	582	76,633	23	2,414

Among the freight and passenger steam vessels the largest number were owned by individuals, but a greater amount of the gross tonnage belonged to corporations.

Corporation ownership was reported more numerously than that of any other kind for tugs and other towing vessels, both as to number and as to tonnage.

TABLE 11.—*Unrigged vessels, by occupation, with per cent each class is of total: 1906.*

OCCUPATION.	Number of vessels.	Per cent.	Gross tonnage.	Per cent.	Value of vessels.	Per cent.
Total	1,789	100.0	237,466	100.0	$2,344,318	100.0
Canal boats	1,566	87.5	198,247	83.5	1,821,822	77.7
All other	223	12.5	39,219	16.5	522,496	22.3

Canal boats are the chief kind included in unrigged craft; their number was larger in proportion to the total than their gross tonnage or value.

The unrigged craft other than canal boats consisted for the most part of scows—some of which were used as lighters—barges, and dredges. This class also included pile drivers and some ferryboats.

CONSTRUCTION.

The steel vessels were few. They had their rise in the experiments with steel vessels in 1895. One steamer and five consorts took a cargo of street car rails from Cleveland to New York city, and returned with sugar for Cleveland, Indianapolis, and St. Louis. Fierce storms were encountered on Lake Erie, but the vessels rode them out. On the second trip down they carried rails for Staten Island and flour for Ireland. More gales were experienced on Lake Erie, but practically no damage was done. The best time made by the boats was thirteen days from New York to Cleveland. So pleased were the owners that three additional fleets were ordered. The towing boat was a propeller, with an engine of 120 horsepower and a net tonnage of 130. The boats were 98 feet long and 17 feet 11 inches wide, with a depth of 10 feet. The consorts had a net tonnage of 235, and were loaded to a draft of 6 feet.[1] These original vessels are now in operation at Manila, P. I.

[1] Annual Report of State Engineer and Surveyor of the State of New York, 1895, page 21ff.

TABLE 12.—NUMBER, GROSS TONNAGE, AND VALUE OF VESSELS, BY CHARACTER OF CONSTRUCTION: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1906	2,140	259,491	$4,586,791	22	6,705	$767,315	2,112	252,598	$3,800,176	6	188	$19,300
	1889	6,575	996,629	6,138,914	6	1,404	109,000	6,569	995,225	6,029,914			
Steam	1906	337	21,507	2,225,673	12	5,103	673,325	320	16,319	1,533,848	5	85	18,500
	1889	163	19,223	790,000	6	1,404	109,000	157	17,819	681,000			
Freight and passenger	1906	166	16,477	1,281,737	5	4,386	489,625	161	12,091	792,112			
	1889	150	18,174	690,500	6	1,404	109,000	144	16,770	581,500			
Tugs and other towing vessels	1906	75	2,733	361,464	4	534	92,000	67	2,139	254,964	4	60	14,500
	1889	6	652	61,000				6	652	61,000			
Ferryboats	1906	5	307	86,500				5	307	86,500			
	1889	1	5	1,500				1	5	1,500			
Yachts	1906	75	1,284	460,322	3	183	91,700	71	1,076	364,622	1	25	4,000
	1889	3	74	19,000				3	74	19,000			
All other	1906	16	706	35,650				16	706	35,650			
	1889	3	318	18,000				3	318	18,000			
Sail	1906	14	518	16,800				14	518	16,800			
	1889	25	1,925	36,800				25	1,925	36,800			
Freight and passenger	1906	4	326	2,250				4	326	2,250			
	1889	25	1,925	36,800				25	1,925	36,800			
Yachts	1906	10	192	14,550				10	192	14,550			
	1889												
Unrigged[1]	1906	1,789	237,466	2,344,318	10	1,602	93,990	1,778	235,761	2,249,528	1	103	800
	1889	6,387	975,481	5,312,114				6,387	975,481	5,312,114			

[1] The character of construction of unrigged craft was not reported in 1889, but for purposes of comparison in this table all were assumed to be of wood.

The very large decrease in the number, tonnage, and value of all vessels in 1906 as compared with 1889 is due almost wholly to the decrease in unrigged boats built of wood. There was a decided increase in the number of steam vessels, in the case of those built of iron and steel and those constructed of wood. Boats of composite construction have come into statistical existence since 1889.

TABLE 13.—*Canal boats, by character of construction: 1906.*

CONSTRUCTION.	Number of vessels.	Gross tonnage.	Value of vessels.
Total	1,566	198,247	$1,821,822
Steel	9	602	18,500
Wood	1,556	197,542	1,802,522
Composite	1	103	800

Of the canal boats, 99.4 per cent were built of wood. These represent 99.6 per cent of the gross tonnage and 98.9 per cent of the value.

The decrease in unrigged craft amounted to 72 per cent in number, and 75.7 per cent in tonnage. Of this kind of vessel, no iron and steel boats and none of composite construction were shown separately in 1889; these are presented for the first time in this report.

The increase in steam vessels of all kinds was 106.7 per cent in number, 11.9 per cent in tonnage, and 181.7 per cent in value. In steam vessels of iron and steel construction the increase in value, 517.7 per cent, was greater than the increase in value of those built of wood, 125.2 per cent; but the increase in the number of the latter, 103.8 per cent, was greater than the corresponding increase, 100 per cent, for the former. Wooden steam vessels decreased 8.4 per cent in tonnage although they increased in number and value. The only iron and steel vessels shown in 1889 were freight and passenger vessels; by 1906 the number of these vessels had decreased by one, but the tonnage and value had increased largely.

The average value per vessel and average value per ton were greater in 1906 than in 1889 for vessels of all kinds, and in all particulars for such as were of iron or steel construction.

TABLE 14.—AVERAGE GROSS TONNAGE AND VALUE PER VESSEL AND AVERAGE VALUE PER TON: 1906 AND 1889.

CLASS AND OCCUPATION.	Census.	TOTAL.			IRON AND STEEL.			WOOD.			COMPOSITE.		
		Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.	Average tonnage per vessel.	Average value per vessel.	Average value per ton.
Total	1906	121	$2,143	$18	305	$34,878	$114	120	$1,799	$15	31	$3,217	$103
	1889	152	934	6	234	18,167	78	152	918	6	.....	.....	.....
Steam	1906	64	6,604	103	425	56,110	132	51	4,793	94	17	3,700	218
	1889	118	4,847	41	234	18,167	78	114	4,338	38	.....	.....	.....
Freight and passenger	1906	99	7,721	78	877	97,925	112	75	4,920	66	.....	.....	.....
	1889	121	4,603	38	234	18,167	78	116	4,038	35	.....	.....	.....
Tugs and other towing vessels	1906	36	4,820	132	133	23,000	172	32	3,805	119	15	3,625	242
	1889	109	10,167	94	.....	.....	.....	109	10,167	94	.....	.....	.....
Ferryboats	1906	61	17,300	282	.....	.....	.....	61	17,300	282	.....	.....	.....
	1889	5	1,500	300	.....	.....	.....	5	1,500	300	.....	.....	.....
Yachts	1906	17	6,138	358	61	30,567	501	15	5,136	339	25	4,000	16
	1889	25	6,333	257	.....	.....	.....	25	6,333	257	.....	.....	.....
All other	1906	44	2,228	50	.....	.....	.....	44	2,228	50	.....	.....	.....
	1889	106	6,000	57	.....	.....	.....	106	6,000	57	.....	.....	.....
Sail	1906	37	1,200	32	.....	.....	.....	37	1,200	32	.....	.....	.....
	1889	77	1,472	19	.....	.....	.....	77	1,472	19	.....	.....	.....
Freight and passenger	1906	82	562	7	.....	.....	.....	82	562	7	.....	.....	.....
	1889	77	1,472	19	.....	.....	.....	77	1,472	19	.....	.....	.....
Yachts	1906	19	1,455	76	.....	.....	.....	19	1,455	76	.....	.....	.....
	1889	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unrigged	1906	133	1,310	10	160	9,399	59	132	1,265	10	103	800	8
	1889	153	832	5	.....	.....	.....	153	832	5	.....	.....	.....

The average tonnage of vessels of wooden construction diminished between 1889 and 1906, although the average value per vessel nearly doubled and the average value per ton more than doubled. The averages for iron and steel vessels were markedly greater in every respect. In wooden tugs there was a large decrease in average tonnage and average value per vessel, but an increase in value per ton. No iron or steel construction was reported for ferryboats on inland waters; the increase in wooden boats used for ferriage is large. The unrigged craft, which were mostly canal boats, show an average tonnage for 1906 considerably less than that for 1889, but the average values per vessel and per ton increased. While the average tonnage of wooden unrigged craft diminished, the average value increased.

INCOME.

As the principal business of the greater number of the vessels was the carrying of freight, it was natural that the greater part of the income—70.4 per cent—should be from that source. By far the greatest receipts were credited to towing vessels and unrigged craft.

Relatively to total receipts for each division the receipts from passenger traffic on all other inland waters were greater than the corresponding receipts for canals and other inland waters of New York state. The percentages were 14 for the former and 9.5 for the latter. Of their total income, the boats plying on New York waters received 79.1 per cent from freight; those on all other inland waters received 50.1 per cent from that source.

TABLE 15.—*Gross income—all vessels and craft, by divisions and occupation: 1906.*

DIVISION AND OCCUPATION.	Total.	Freight.	Passenger.	All other.
Total	$3,957,729	$2,787,696	$429,393	$740,640
Freight and passenger	713,020	293,686	388,370	30,964
Towing vessels and unrigged craft	3,186,462	2,489,290	7,013	690,159
All other	58,247	4,720	34,010	19,517
Canals and other inland waters of New York state	2,781,604	2,198,920	264,397	318,287
Freight and passenger	387,489	108,648	259,037	19,804
Towing vessels and unrigged craft	2,388,965	2,090,272	1,350	297,343
All other	5,150		4,010	1,140
All other inland waters	1,176,125	588,776	164,996	422,353
Freight and passenger	325,531	185,038	129,333	11,160
Towing vessels and unrigged craft	797,497	399,018	5,663	392,816
All other	53,097	4,720	30,000	18,377

EMPLOYEES AND WAGES.

The number of employees on vessels formed 90.6 per cent of the total number of employees on both land and water, and their salaries and wages were 88.2 per cent of the total.

In showing number and compensation no distinction has been made between wage-earners and officers and clerks on vessels, but this segregation has been made for employees on land. Of the land force, 32.6 per cent were officers, managers, clerks, etc., and their salaries constituted 44.7 per cent of the total salaries and wages paid on land. The proportion shown for the waters of New York state is greater in the case of numbers and of salaries.

TABLE 16.—*Employees, and salaries and wages, by divisions: 1906.*

DIVISION AND EMPLOYEES.	Number of employees.	Salaries and wages.
Total	4,118	$1,543,486
On vessels	3,731	1,361,030
On land	387	182,456
Officers, managers, clerks, etc	126	81,497
All other	261	100,959
Canals and other inland waters of New York state	2,710	1,020,715
On vessels	2,472	920,260
On land	238	100,455
Officers, managers, clerks, etc	92	54,695
All other	146	45,760
All other inland waters	1,408	522,771
On vessels	1,259	440,770
On land	149	82,001
Officers, managers, clerks, etc	34	26,802
All other	115	55,199

CHARACTER OF PROPULSION AND HORSEPOWER.

More than four-fifths of the steam vessels were equipped with screws, an almost necessary feature when canals are to be traversed. Stern wheelers, while few, were more numerous than side wheelers.

TABLE 17.—CHARACTER OF PROPULSION AND HORSEPOWER OF STEAM VESSELS, BY OCCUPATION: 1906.

OCCUPATION.	CHARACTER OF PROPULSION.					HORSEPOWER OF ENGINES.			
	Total.	Screw (number).	Side wheel (number).	Stern wheel (number).	All other (number).	Total.	Steam.	Gasoline.	All other.
Total	337	285	18	34		28,126	26,402	1,708	16
Freight and passenger	166	129	13	24		17,324	17,028	296	
Tugs and other towing vessels	75	68	2	5		5,283	4,988	295	
Ferryboats	5	2	3			822	822		
Yachts	75	73		2		4,111	3,061	1,034	16
All other	16	13		3		586	503	83	

The steam horsepower was 93.9 per cent of the total. Gasoline engines were most largely used for yachts, 25.2 per cent of the total horsepower being from engines of this character. Yachts also had the entire number of "all other" kinds of engines.

FREIGHT.

In considering the statistics of freight it must be remembered that the figures were obtained from owners and managers of craft plying either wholly or in part on the canals and other inland waterways of the states, and not from official records or clearances kept by canal or other authorities. Under Census Office methods the freight of a boat operating on canals is classified according to the waters on which the greater part of its freight is carried or the greater part of its time is spent. Thus all the freight boats operating partly on canals or other inland waterways of New York state, but carrying more freight or spending a greater part of the season on the navigable rivers or in the harbors of New York, are included under subdivisions of waters other than canals and other inland waters of New York state, as for instance, under the section on the Atlantic coast and Gulf of Mexico. The statistics, therefore, do not show separately all the freight carried on the canals and inland waterways of the state.

The amount of freight lightered is not shown in the tables. Some of this lightering was done in the different canals of New York state, and some in the harbors of New York and Buffalo. The total lighterage returned for the canals and other inland waters of New York state was 209,590 tons, and that for all other inland waters, 18,300 tons.

TABLE 18.—*Freight shipped, by commodities: 1906.*

COMMODITY.	Quantity.
Total.....net tons..	3,716,765
Canned goods.....net tons..	1,110
Cement, brick, and lime.....net tons..	79,754
Coal.....net tons..	899,593
Cotton.....net tons..	1,413
Flour.....net tons..	4,696
Fruits and vegetables.....net tons..	15,867
Grain.....net tons..	499,340
Ice.....net tons..	71,029
Iron ore.....net tons..	36,612
Lumber.....M feet..	[1] 226,752
Naval stores.....net tons..	7,729
Petroleum and other oils.....barrels..	[2] 2,630
Phosphate and fertilizer.....net tons..	7,775
Pig iron and steel rails.....net tons..	11,750
Stone, sand, etc.....net tons..	924,351
Tobacco.....net tons..	1
Miscellaneous merchandise.....net tons..	785,577

[1] Equals 359,576 net tons. [2] Equals 592 net tons.

The largest quantity of freight reported was for stone, sand, etc.; almost one-fourth of the total net tons was in this classification. Coal freights were only a little less.

The miscellaneous group, comprising salt, sulphur, sugar, etc., constituted over one-fifth of the tonnage. These three groups accounted for seven-tenths of the total. Grain and lumber, the only other commodities for which large quantities are shown, made more than one-fifth. It is probable that the boat owners did not report all of the lumber way freight east, or all of the stone and sand, and that the totals of certain other items, as for instance ice, would be considerably enlarged if credit for the commodities were not given, in accordance with the custom of the Office, to waters in which the craft carrying them were occupied the major part of the season.

Freight on inland waterways of New York.—Concerning the Delaware and Hudson canal in New York state no census figures are presented separately because the traffic is credited to the Hudson river, and statistics for the Hudson river are included in the section on Atlantic coast and Gulf of Mexico. About nine miles of the canal—from High Falls to Eddyville—were in use. The 25 canal boats of the owning company carried 117,750 tons of cement during 1906—all of it from the works of the company.

The New York state report [1] covers all freight on state canals, whether the freight was carried by boats the chief traffic of which was in other waters or by boats freighting exclusively on the canals. It does not include freights on the other inland waters of the state, as does the Census report. These differences necessarily preclude close agreement between the statistics of the two reports. The number of commodities for which quantities are given in the state report is much larger than the number shown in the Census report. In Table 19 these have been rearranged, so far as possible, in more general accordance with the classifications of the Census.

[1] Report on Canals of the Superintendent of Public Works of the State of New York, 1906, pages 235 to 241.

TABLE 19.—CANALS OF NEW YORK—FREIGHT CARRIED, BY COMMODITIES AND CANALS: 1906.[1]

COMMODITY.	Total (net tons).	Erie canal (net tons).	Champlain canal (net tons).	Oswego canal (net tons).	Cayuga and Seneca canal (net tons).	Black River canal (net tons).
Total	3,540,907	2,385,491	740,983	172,228	164,874	77,331
Coal	545,941	268,150	182,518	17,481	76,124	1,668
Flour	300	178				122
Grain	554,291	517,605	1,482	11,514	23,214	476
Ice	116,508	50,661	42,427	23,420		
Iron ore	31,446	2,348	29,098			
Lumber	672,023	442,553	204,023	14,674	42	10,731
Petroleum	98	94				4
Pig iron	15,517	14,437	1,080			
Pulp wood	171,686	3,205	127,425	37,818		3,238
Rock and superphosphate	13,903	13,833				70
Salt, domestic	154,490	95,962	433	8,967	48,801	237
Salt, foreign	180		180			
Stone, lime, and clay	910,497	710,499	94,916	40,801	5,772	58,449
Wood pulp	2,035	1,635	400			
Miscellaneous merchandise	352,082	264,331	57,001	17,403	10,921	2,336

[1] From Report on Canals of the Superintendent of Public Works of the State of New York, 1906.

Over two-thirds of the traffic was on the Erie canal and more than one-fifth on the Champlain. The Oswego and the Cayuga and Seneca had about one-tenth between them, the Black River canal coming last with the residue.

Table 20 shows how the way and the through freight was distributed, by canals.

Table 21, from the state report, shows the quantity of the freight that went down the Hudson river to New York city.

TABLE 20.—*Canals of New York—way and through freight: 1906.*[1]

CANAL.	Total (net tons).	Way (net tons).	Through (net tons).
Total	3,540,907	2,534,493	1,006,414
Erie	2,385,491	1,713,350	672,141
Champlain	740,983	406,710	334,273
Oswego	172,228	172,228	
Cayuga and Seneca	164,874	164,874	
Black River	77,331	77,331	

[1] From Report on Canals of the Superintendent of Public Works of the State of New York, 1906, page 6.

TABLE 21.—*Canals of New York—freight to New York city, by commodities: 1906.*[1]

COMMODITY.	Quantity (net tons).
Total	953,202
Coal	230
Grain	290,513
Ice	93,072
Iron ore	29,643
Lumber	231,165
Pig iron	12,942
Stone, lime, and clay	104,118
Miscellaneous merchandise	191,519

[1] From Report on Canals of the Superintendent of Public Works of the State of New York, 1906, pages 280 to 284.

The Bureau of the Census has taken as the foundation of its discussion of the quantity and kind of freight carried on the Great Lakes, the statistics given by the Bureau of Statistics of the Department of Commerce and Labor, in order not to duplicate the work. There is, therefore, in the absence of individual census schedules of craft giving statistics of traffic by ports, no way of ascertaining what freight, if any, entered the Erie canal in boats the operations of which are included in the section on the Great Lakes.

The disparity between the totals for the Erie canal in the Census returns and those in the New York state report is largely attributable, it is believed, to differences in statistical methods.

The total traffic in the Erie canal is given in Table 22, which shows data for the freight going over the canal but included in the statistics for Atlantic coast and Gulf of Mexico and for freight carried on the canals and other inland waters of New York state, and compares the totals with those shown in the New York state report.

Table 23 shows the aggregate for the freight traffic of "canals and all other inland waters of New York state" and the freight carried on all such waters in the state, the operations of which are included in the statistics of transportation for the Atlantic coast and Gulf of Mexico.

The Census report of traffic over the Hudson river in 1906 to and from the New York canals shows a movement of 2,046,145 tons, this amount being included in the statistics for canals and other inland waters of New York state.

TABLE 22.—*Erie canal—freight, by commodities: 1906.*

COMMODITY.	CENSUS REPORT.			New York state report (net tons).
	Total (net tons).	Canals and all other inland waters of New York state (net tons).	Atlantic coast and Gulf of Mexico (net tons).	
Total	1,523,461	1,473,612	49,849	2,385,491
Canned goods	1,000	1,000	.....	(1)
Cement, brick, and lime	28,680	16,595	12,085	(2)
Coal	176,040	174,649	1,391	268,150
Flour	277	277	.....	178
Fruits and vegetables	5,709	5,709	.....	.....
Grain	466,690	460,714	5,976	517,605
Ice	35,314	16,447	18,867	50,661
Iron ore	659	659	.....	2,348
Lumber	174,925	174,925	.....	442,553
Naval stores	5,214	5,214	.....	.....
Petroleum and other oils	462	462	.....	94
Phosphate and fertilizer	4,504	4,504	.....	13,833
Pig iron and steel rails	10,788	9,918	870	14,437
Stone, sand, etc	246,519	242,039	4,480	710,499
Miscellaneous merchandise	366,680	360,500	6,180	365,133

[1] Probably included in miscellaneous merchandise.
[2] Probably included in "stone, lime, and clay," the New York classification, equivalent to the Census classification, "stone, sand, etc."

TABLE 23.—*Canals and other inland waters of New York state—freight, by commodities: 1906.*

COMMODITY.	Total (net tons).	Canals and all other inland waters of New York state (net tons).	Atlantic coast and Gulf of Mexico (net tons).
Total	2,584,722	2,502,891	[1] 81,831
Canned goods	1,000	1,000	.....
Cement, brick, and lime	89,739	77,464	12,275
Coal	472,657	453,709	18,948
Flour	277	277	.....
Fruits and vegetables	15,546	15,546	.....
Grain	472,953	466,977	5,976
Ice	90,118	68,059	22,059
Iron ore	37,867	36,612	1,255
Lumber	318,849	317,440	1,409
Naval stores	7,526	7,526	.....
Petroleum and other oils	462	462	.....
Phosphate and fertilizer	7,775	7,775	.....
Pig iron and steel rails	12,414	11,370	1,044
Stone, sand, etc	342,703	335,176	7,527
Miscellaneous merchandise	714,836	703,498	11,338

[1] In addition there were 117,500 tons of cement carried on the Delaware and Hudson canal, a waterway not owned by the state, and statistics for which, therefore, are not given in the New York state report.

TABLE 24.—HUDSON RIVER AND NEW YORK CITY—FREIGHT TO AND FROM NEW YORK CANALS, BY COMMODITIES: 1906.

COMMODITY.	Aggregate traffic (net tons).	TOTAL (NET TONS).		NEW YORK CITY (NET TONS).		ALL OTHER HUDSON RIVER PORTS (NET TONS).		ALL OTHER PORTS (NET TONS).	
		Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.
Total	2,046,145	1,070,881	975,264	834,706	425,309	21,657	18,534	214,518	531,421
Canned goods	75	.....	75	.....	75	.....	.....	.....	.....
Cement, brick, and lime	72,642	54,816	17,826	50,878	9,791	440	3,790	3,498	4,245
Coal	500,592	196,719	303,873	39,514	120,198	7,876	9,241	149,329	174,434
Flour	170	170	.....	170	.....	.....	.....	.....	.....
Fruits and vegetables	7,468	7,284	184	7,284	75	.....	.....	.....	109
Grain	364,652	362,681	1,971	360,739	1,191	1,440	.....	502	780
Ice	29,849	26,999	2,850	26,199	.....	800	2,850	.....	.....
Iron ore	18,803	17,778	1,025	846	.....	200	.....	16,732	1,025
Lumber	325,390	205,956	119,434	200,369	8,757	3,225	492	2,362	110,185
Naval stores	9,138	1,612	7,526	.....	7,497	.....	.....	1,612	29
Petroleum and other oils	466	424	42	.....	42	.....	.....	424	.....
Phosphate and fertilizer	7,615	2,283	5,332	154	5,178	.....	.....	2,129	154
Pig iron and steel rails	8,820	6,791	2,029	5,931	1,054	.....	.....	860	975
Stone, sand, etc	121,656	60,735	60,921	29,310	56,519	2,270	1,463	29,155	2,939
Miscellaneous merchandise	578,809	126,633	452,176	113,312	214,932	5,406	698	7,915	236,546

The greatest quantities of freight reported are those of coal, grain, and lumber. The column of receipts may be taken to be the freight coming East, and naturally grain and lumber, largely the production of the West, preponderate. Just as naturally, if "shipments" are taken to be freight going West, the greatest quantities shipped from the East are shown for miscellaneous merchandise—sulphur, emery ore, sugar, tin, rosin, asphalt, alum, etc.—and for coal.

A knowledge of the freight carried on the Hudson river, from whatever port derived or to whatever port sent, is of interest and value. To obtain this, the traffic to and from all Hudson river ports, and the traffic to and from the canals shown in the statistics for the Atlantic coast and Gulf of Mexico, must be added to the traffic shown in Table 24, which includes only the freight passing up and down the river to and from the canals included in canals and other inland waters of New York state. Freight to or from New York city is not included in this statement of Hudson river traffic unless shipped to, or sent from, Hudson river ports.

Care has been taken not to duplicate the statistics. Freight up the Hudson from all ports, including New York city, outside the river limits is given as received at the various destinations; freight from any river port to outside ports is shown among shipments. The comparatively small quantities shipped from one river port to another are included as receipts to prevent duplication. The figures, therefore, while giving the entire river traffic, can not be used to show with absolute accuracy the traffic by ports.

TABLE 25.—*Hudson river traffic: 1906.*

SOURCE.	Net tons.
Total	8,654,880
To and from New York canals (included in canals and other inland waters of New York state)	2,046,145
To and from New York canals (included in Atlantic coast and Gulf of Mexico)	81,831
To and from river ports (included in Atlantic coast and Gulf of Mexico)	6,526,904

Substantially all of the 81,831 tons of freight which passed through the canals, and which are included in the statistics for the Atlantic coast and Gulf of Mexico, went up or down the Hudson river; a very little of it was way freight shipped from one point on the canals and received at another. There were 2,046,145 tons received from or shipped to New York canal points by way of the Hudson river, as given in Table 24. In the statistics for the Atlantic coast and Gulf of Mexico are included 6,526,904 tons shipped from, or received at, Hudson river ports, but having no connection with the canals.

The receipts and shipments of freight, by commodities, are shown for the Hudson river in Table 26. This traffic includes freight to and from New York canals.

TABLE 26.—*Hudson river receipts and shipments of freight, by commodities: 1906.*

COMMODITY.	Total (net tons).	Received from river, canal, and outside ports (net tons).	Shipped to all canals and outside ports (net tons).
Total	8,654,880	1,751,255	6,903,625
Canned goods	16,322	8,755	7,567
Cement, brick, and lime	2,039,452	103,606	1,935,846
Coal	1,079,712	417,732	661,980
Flour	7,657	6,926	731
Fruits and vegetables	31,029	14,212	16,817
Grain	370,861	362,681	8,180
Ice	1,298,124	28,199	1,269,925
Iron ore	21,134	17,778	3,356
Lumber	571,437	211,876	359,561
Naval stores	9,138	1,612	7,526
Petroleum and other oils	519	424	95
Phosphate and fertilizer	8,907	3,575	5,332
Pig iron and steel rails	28,429	14,950	13,479
Stone, sand, etc	1,836,481	107,488	1,728,993
Tobacco	63		63
Miscellaneous merchandise	1,335,615	451,441	884,174

Freight on inland waterways of states other than New York.—Freight carried on canals and other inland waterways of states exclusive of New York amounted to 1,213,874 net tons. None of it was reported from New England. All the major geographic divisions of the country, except the South Central division, were, however, represented. The South Central division is not shown in this part of the report, because the canals within its borders are ship canals and consequently they are included elsewhere.

The North Central division had a little more than one-half of the total traffic and the North Atlantic (exclusive of New York, it should be remembered) over one-fourth. The South Atlantic had about one-sixth. The Western division was last, with less than one-fifteenth.

Nearly one-half of the freight carried was stone, sand, etc., coal being the next in quantity. The transportation of the former was almost altogether in the North Central division, Illinois being the chief state in the showing. The coal was carried in about equal quantities on the waterways of the North Atlantic and South Atlantic divisions, the states most largely represented being New Jersey in the former and Maryland in the latter. All the cotton shown was carried on Ohio canals; all the pig iron and steel rails reported, on the waterways of Pennsylvania; and all the tobacco, a solitary ton, on the waterways of Minnesota. Practically all the naval stores were among the freights of Florida.

The analysis is by states, arranged according to their order in the geographic divisions. In some instances a more comprehensive discussion than is afforded by the material in the table itself is given, based upon additional information obtained elsewhere.

TABLE 27.—FREIGHT CARRIED ON CANALS AND OTHER INLAND WATERS OF STATES EXCLUSIVE OF NEW YORK, BY COMMODITIES AND BY DIVISIONS AND STATES: 1906.

DIVISION AND STATE.	Total (net tons).	Canned goods (net tons).	Cement, brick, and lime (net tons).	Coal (net tons).	Cotton (net tons).	Flour (net tons).	Fruits and vegetables (net tons).	Grain (net tons).	Ice (net tons).	Lumber (net tons).	Naval stores (net tons).	Petroleum and other oils (net tons).	Pig iron and steel rails (net tons).	Stone, sand, etc. (net tons).	Tobacco (net tons).	Miscellaneous merchandise (net tons).
United States	1,213,874	110	2,290	445,884	1,413	4,419	321	32,363	2,970	52,136	203	130	380	589,175	1	82,079
North Atlantic division	314,631			212,584									380	91,176		10,491
New Jersey	203,575			140,000										61,221		2,354
Pennsylvania	111,056			72,584									380	29,955		8,137
South Atlantic division	201,150	50		200,000		40	150	60	20	100	200					530
Maryland	200,000			200,000												
West Virginia	500	50				40		60	20	100						230
Florida	650						150				200					300
North Central division	620,841	60	82	33,300	1,413	4,229	51	30,492	2,950	2,836	3	106		497,997	1	47,321
Ohio	84,098	4	5		1,413	10	5		2,950	294	3	56		55,000		24,358
Illinois	449,580			1,300		4,147		14,353						425,397		4,383
Michigan	18,342	50	60			60						12		17,600		560
Wisconsin	39,900			32,000												7,900
Minnesota	9,357	6	17			12	46	15		2,172		38			1	7,050
North Dakota	19,564							16,124		370						3,070
Western division	77,252		2,208			150	120	1,811		49,200		24		2		23,737
Montana	3,065							1,624								1,441
Arizona	4,800		700					175		600						3,325
Idaho	40															40
Washington	54,814					150	120	12		47,850		24		2		6,658
Oregon	14,533		1,508							750						12,275

New Jersey.—All the freight tabulated by the waterways of this state went over the Delaware and Raritan canal, and it was less than that reported by the canal company. Doubtless a part of the freight returned to the Census agents by boat owners and managers is included in the statistics for the Atlantic coast and Gulf of Mexico, the boats passing into those waters and perhaps having their chief traffic therein. No traffic is shown in the Census returns for the Morris canal, the freight on this canal also probably being incorporated with that of the larger division mentioned.

Freight on canals of New Jersey: 1906.

CANAL.	Census (net tons).	Canal company (net tons).
Total	203,575	513,043
Delaware and Raritan	203,575	424,986
Morris		88,057

The freight reported for New Jersey was very largely coal and nearly one-third was stone, sand, etc.

Pennsylvania.—The Census returns for this state show a total of 111,056 tons of freight transported on the canals, while the returns from the canal companies show a total of 294,979 tons. The difference is due to the difference in methods of statistical distribution and tabulation. The Lehigh Coal and Navigation Company's coal coming down its canal was taken over the Delaware river to Philadelphia, and is credited in the Census returns to transportation on the Atlantic coast. The entire traffic on this canal was reported to be coal. On the Schuylkill Navigation Company's canal the greater part of the freight was coal, 55,884 tons of coal being returned, with 29,711 tons of stone, sand, etc., 8,137 tons of miscellaneous merchandise, and 380 tons of pig iron and steel rails.

Freight on waterways of Pennsylvania: 1906.

CANAL.	Census (net tons).	Canal company (net tons).
Total	111,056	294,979
Lehigh Coal and Navigation Company	16,944	240,625
Schuylkill Navigation Company	94,112	54,354

In addition to the canal freight shown in the statement, there is a vast traffic on the Allegheny, Monongahela, and Ohio rivers in Pennsylvania, emanating largely from Pittsburg. The amount of freight carried on these canalized rivers is included, according to the report of the Census Office, in the returns for the Mississippi river and its tributaries. The report of the Chief of Engineers, U. S. Army, shows that over 16,000,000 tons of freight were carried on the Allegheny, Monongahela, and Ohio rivers.

It is stated that the annual freight traffic in the Pittsburg district exceeds 86,000,000 tons, and by far the largest portion of it consists of products particularly adapted to water transportation.[1]

[1] C. H. Forbes-Lindsay, "The Revival of the Waterway," in The World To-day for May, 1908, pages 497 and 498.

Delaware.—The Chesapeake and Delaware canal is a ship canal and the traffic on it, therefore, is not shown in this section of the report. According to the report of the canal company operating it, the freight carried in 1906 aggregated 683,086 tons. Part of the canal is in Maryland and extends from the boundary line of the state to Chesapeake bay.

Maryland.—The canal traffic, except that on the small part of the Chesapeake and Delaware canal that lies within the state, is over the Chesapeake and Ohio canal, and, as reported to the Census agents both by boat owners and by the canal company, consisted entirely, in 1906, of the transportation of coal. The boat owners reported 200,000 tons, the canal company 225,143. There may have been a difference in the time covered by the operations of boats and that by the report of the company.

Virginia.—The canals in this state are ship canals—the Albemarle and Chesapeake, extending from Norfolk, Va., to Albemarle Sound, N. C., and the Lake Drummond, or Dismal Swamp, from Elizabeth river, Va., to Pasquotank river, N. C.—both owned by canal companies. The traffic figures are reported by the canal companies as a total of 95,269 tons on the former and of 340,135 tons on the latter, an aggregate of 435,404 tons. The Census figures are in the Atlantic coast and Gulf of Mexico section of this report.

West Virginia.—There are no canals in this state, but a little traffic was reported on a canalized river, the Monongahela. Nearly one-half of the 500 tons was miscellaneous merchandise. Of lumber, there were 100 tons and of grain, 60. Canned goods, flour, and ice made up the balance of the freight. The traffic on the canalized rivers of West Virginia, except as above given, is included in the section on the Mississippi river and its tributaries. The traffic on the Great Kanawha for the year ending June 30, 1905, is given by the Chief of Engineers, U. S. Army, as 1,613,889 tons, and that on the Little Kanawha as 106,510 tons.

Georgia.—The canal traffic in this state is limited to the Augusta canal, owned by the city of Augusta. It is denominated a ship canal, and therefore is not within the limitations of the statistics shown in this section of the report. The canal owner reported that 7,004 tons of freight passed through it in 1906.

Florida.—The traffic reported for the inland waters of Florida was a matter of 650 tons, all of which were carried on the Kissimmee river. Besides miscellaneous merchandise, the commodities reported for this state were naval stores and fruits and vegetables.

Ohio.—The traffic on the Muskingum river improvement is not shown here, nor that on the Ohio canal and its branches. For the former the Chief of Engineers, U. S. Army, reported freight carried to the amount of 50,668 tons for the year ending June 30, 1905. The entire quantity shown in "canals and other inland waters" for this state amounted to 84,098 tons, all of which were returned by boats operating on the Miami and Erie canal. The state canal office reported 8,818 tons on the Ohio and branches and 75,234 tons on the Miami and Erie, with about 7,000 additional tons (as estimated) for which no weight was returned.

Illinois.—Most of the freight reported as carried on the canals of Illinois was returned by boats operating on the Chicago Drainage and Ship canal, transporting principally stone, sand, etc., these articles constituting 94.6 per cent of the total. Grain was the commodity carried in next greatest quantity, while miscellaneous merchandise, flour, and coal followed in the order named. The total traffic reported was nearly 500,000 net tons.

Freight on waterways of Illinois: 1906.

CANAL.	Census (net tons).	Canal company (net tons).	CANALIZED RIVER.	Report of Chief of Engineers, U. S. A. (net tons).
Total	449,580	6,470	Total	33,178
Illinois and Michigan	3,500	6,470	Galena	4,245
Chicago Drainage and Ship	446,080	(1)	Illinois	24,943
			Wabash	3,990

[1] Not reported.

The traffic on the Illinois and Michigan canal was, as reported, wholly in grain, leaving the rest of the grain and all the other commodities credited to the Chicago Drainage and Ship canal.

For the Illinois and Mississippi Government canal 699 tons were reported by the Chief of Engineers, U. S. Army, as transported in 1906.

Michigan.—There are none but Government canals in Michigan, and the traffic on these canals is not shown in this section of the report. The freight reported on the inland waters of Michigan was for a lake, and for a river tributary to Lake Michigan. For no other section of the country but the section covered by the Great Lakes is the traffic on navigable rivers included with the traffic on "canals and other inland waters." On Leelanau Lake 382 tons were transported and on Saginaw river 17,960 tons, the total being 18,342 tons. Building materials were the commodities shown in largest quantity and exclusively on the Saginaw river. The lake traffic was quite limited, the largest part consisting of miscellaneous merchandise. If the tonnage on the Government canals were included, the traffic would aggregate over 95,000,000 tons.

Wisconsin.—The Fox river is credited with bearing 38,650 tons of traffic, 32,000 of which were coal and the rest miscellaneous merchandise. Some of the freight was carried on Lake Winnebago exclusively, but this freight can not be segregated. The Portage canal between Fox and Wisconsin rivers is considered in the Census report as a part of Fox river. The Fox and the Chippewa rivers are both canalized. For the former the report of the Chief of Engineers,

U. S. Army, shows a tonnage of 263,589; no report is made for the Chippewa.

The Sturgeon Bay and Lake Michigan Government canal is credited with 617,210 tons.

Minnesota.—There are neither canals nor canalized rivers in this state. The traffic reported to the Census and included in this section of the report was on its lakes and on Rainy river (which is part of the boundary line between Minnesota and Canada). The other river traffic—except that on the Red River (of the North), which is given as in North Dakota—appears in the section on the Mississippi river and its tributaries.

Freight on waterways of Minnesota: 1906.

LAKE OR RIVER.	Quantity (net tons).
Total	9,357
Bass Lake	1,700
Lake of the Woods	2,111
Rainy Lake	2,050
Rainy river	2,696
Vermillion Lake	800

Of the total freight shown the greatest part was given as miscellaneous merchandise, which was about evenly distributed among Bass Lake, Lake of the Woods, and Rainy Lake. The lumber, amounting to 2,172 tons, was carried almost wholly upon Rainy river. The solitary ton of tobacco reported was transported over the Lake of the Woods. For Rainy river the largest traffic was reported—2,696 tons, including 34 tons of petroleum and other oils. All the freight on Bass, Rainy, and Vermillion lakes was returned as miscellaneous.

Iowa.—The Des Moines Rapids is a Government canal, and the traffic on it is included elsewhere. The report of the Chief of Engineers, U. S. Army, shows that 8,520 tons were transported upon it in 1906.

North Dakota.—The traffic on the Red River (of the North), the boundary between this state and Minnesota, is credited to North Dakota. There are no canalized rivers in the state, but there are navigable rivers. The freight reported for the inland waterways of North Dakota was carried on the Red River (of the North) and the Rivière des Lacs, a lake-like river in the northernmost part of the state. These are not tributary to the Mississippi river; all rivers, such as the Missouri, tributary to the Mississippi, are included in the section of the report relating to the Mississippi river and its tributaries. Of the 19,564 tons shown here as carried on the inland waters of North Dakota, 13,964 tons were reported from the Red River (of the North) and 5,600 from the Rivière des Lacs. Grain was the only commodity on the latter; and on the former it was the chief commodity, amounting to 10,524 tons, or about three-fourths of the total. A small quantity—370 tons—of lumber was carried; the remainder, or 3,070 tons, was composed of miscellaneous merchandise.

Kentucky.—For the Louisville and Portland canal, a Government canal not included in this section of the report, the report of the Chief of Engineers, U. S. Army, gives 1,053,526 tons of freight for 1906. In addition there are several canalized rivers in the state, the Government reports also giving total tonnage on these.

Freight on canalized rivers of Kentucky: 1906.

RIVER.	Quantity (net tons).
Total	729,428
Kentucky	201,510
Green and Barren	342,495
Big Sandy	148,623
Rough	36,800

Tennessee.—There are no canals in this state, but there are both navigable and canalized rivers. For the fiscal year ending June 30, 1905, 119,009 tons were carried on the Cumberland.

Alabama.—The Government canal around the Muscle shoals in the Tennessee river at Florence is credited with about 26,878 tons of freight for 1906, and the Black Warrior river with 16,281 tons.

Louisiana.—All the canals in this state are owned by corporations, and as they are classed as ship canals no returns for them are included in this section of the report on transportation by water. Nevertheless the corporations have made certain returns of tonnage.

Freight on canals of Louisiana: 1906.

CANAL.	Quantity (net tons).
Total	683,900
New Basin	500,000
Old Basin	60,000
Harvey's	50,000
Company's	50,000
Lake Borgne	23,900

The great water traffic of this state, including that on these ship canals, is shown in the section on the Mississippi river and its tributaries.

Arkansas.—For the upper White river, a canalized waterway, a tonnage of 7,999 was reported for 1906.

Texas.—There are several canals in this state, the Morris and Cummings being the only one owned by a private corporation. The statistics obtained from boat owners and managers are not included in this section of the report, but the owners of the canal reported the carriage of 2,000 tons of freight in 1906. Government canals are the Port Arthur, the Galveston and Brazos, and the Morgan; for these no statistics were secured.

Montana.—The freight on inland waterways of Montana was carried on the Flathead river and lake and the Kootenai river. It aggregated 3,065 tons, consisting of 1,624 tons of grain and 1,441 tons of miscellaneous merchandise. All the grain was carried on the Flathead river. These waters are partly navigable and are not canalized. There are no canals in the state.

Arizona.—The freight on the Colorado river in this state is included here; it amounted to 4,800 tons. The bulk of it is classed as miscellaneous merchandise; while 700 tons were cement, brick, and lime, 600 tons were lumber, and 175 tons were grain.

Idaho.—The entire quantity of freight shown for the inland waterways of this state was reported from boats operating on Lake Kaniksu. It aggregated 40 tons and is classed as miscellaneous merchandise.

Washington.—Of the 54,814 tons of freight included as transported on the inland waterways of Washington, nearly all, or 53,990 tons, is shown for the Pend d'Oreille river. From Lake Chelan 524 tons, and from Lake Whatcom 300 tons, were reported. The greatest part of the freight was lumber, of which 47,826 tons were carried on the Pend d'Oreille river and 24 tons on Lake Chelan.

Oregon.—There were 14,533 tons of freight reported for the inland waterways of Oregon. Of this, 5,625 tons were on the canalized Columbia, 8,808 tons on Lower Klamath Lake, and 100 tons on the Coquille river. The greatest part of this freight was miscellaneous merchandise, only 750 tons being lumber, and 1,508 tons cement, brick, and lime. The Portland General Electric Company has a canal around the Falls of Willamette at Oregon City. It reported 43,826 tons going through this canal in the year ending June 30, 1906. The Census figures for this canal are not included in the tables of this section of the report.

Freight on inland waterways of Oregon: 1906.

CANAL.	Canal Company (net tons).	CANALIZED RIVER OR LAKE.	Census (net tons).	Report of Chief of Engineers, U. S. A. (net tons).
Total	43,826	Total	14,533	48,911
Portland General Electric Company (around the Falls of Willamette)	43,826	Columbia river	5,625	46,884
		Coquille river	100	
		Lower Klamath Lake	8,808	
		Yam Hill river		2,027

PASSENGERS.

The 1,871,769 passengers carried by steam vessels on the inland waters of the United States in 1906 were reported from 13 states. The state of New York returned a larger total than that of any other state, although the number for Minnesota was very close to it.

TABLE 28.—*Canals and other inland waters of New York state, and all other inland waters—passengers on steam vessels, by states: 1906.*

STATE.	Total.	Regular.	Excursion.
Total	1,871,769	1,359,648	512,121
New York	828,932	580,246	248,686
California	1,200	1,200	
Idaho	500	500	
Illinois	800		800
Massachusetts	35,000	35,000	
Michigan	96,601	16,301	80,300
Minnesota	784,648	631,236	153,412
Montana	3,287	2,419	868
North Dakota	1,835	1,835	
Oregon	8,119	6,119	2,000
Washington	30,067	28,440	1,627
West Virginia	10,000	8,000	2,000
Wisconsin	70,780	48,352	22,428

The 828,932 passengers carried by steam vessels on the inland waters of New York were reported from 8 waterways. It is probable that, because of the exclusion from the census of steamers of less than 5 tons net register, some passengers, both regular and excursion, have been omitted. It is likely also that in some instances care has not been taken to separate accurately regular passengers from excursionists. Some of the returns are estimates.

TABLE 29.—*Canals and other inland waters of New York state—regular and excursion passengers on steam vessels, by canals and lakes: 1906.*

CANAL AND LAKE.	Total.	Regular.	Excursion.
Total	828,932	580,246	248,686
On canals	61,049	26,799	34,250
Cayuga and Seneca canal and Lake Cayuga	19,000	12,000	7,000
Cayuga and Seneca canal and Lake Seneca	5,489	1,189	4,300
Erie canal	32,000	9,050	22,950
Oswego canal	4,560	4,560	
On lakes	767,883	553,447	214,436
Lake Canandaigua	39,360	27,360	12,000
Lake Cayuga	45,600	20,000	25,600
Lake Champlain	192,867	187,891	4,976
Lake Chautauqua	326,904	192,044	134,860
Lake Conesus	39,217	14,217	25,000
Lake George	106,835	106,835	
Lake Seneca	17,100	5,100	12,000

There were 6,120 passengers carried by unrigged craft, all in New York state: 4,120 on the Erie canal, 2,520 being regular, and 2,000, all regular, on Lake Champlain.

The Erie canal passengers were carried between Syracuse and near-by points; between Tonawanda and adjacent places; and between Schenectady, Fort Plain, and Amsterdam. The largest number of passengers carried on the inland waters of New York were reported from Lake Chautauqua, probably as a result of the educational and other assemblies held there during the summer. It is stated [1] that in 1825, the year the Erie canal was opened, the number of persons passing Utica in freight and packet boats during the season was over 40,000. At that time the railroads were not extensively in operation, and travel by canal boat offered advantages greater than those prevailing today. Notwithstanding this, in 1906 the number of passengers taken from one point to another on the canal was 36,120, 32,000 being carried by steam vessels and 4,120 by canal boats.

POWER ON CANALS.

Steam.—Although the feasibility of using steam as a motive power on the Erie canal was discussed [2] before the opening of the canal in 1825, a steam-propelled canal boat was not successfully introduced until November 17, 1870.[3] This boat went up the Hudson

[1] State of New York, Report of the State Engineer and Surveyor, Supplement, History of New York Canals, Vol. I, 1905, "Chronological Résumé of Laws and Events," page 958.

[2] Ibid., Vol. II, 1905, Bibliography, page 1339.

[3] Ibid., Vol. I, 1905, "Chronological Résumé of Laws and Events," page 966.

river and through the canal to Schenectady and returned. The first steamer began to ply on the Erie canal the year following. In 1874 there were 15 steamers in operation; in 1883 there were 92. In 1891, however, only 29 were in active service.[1] In 1906, according to the Census returns, 64 steamers and steam canal boats were in operation on the canals of New York and 20 on the canals of other states.

Electric.—Several methods of hauling canal boats by means of electricity have been tried on the canals of New York, Pennsylvania, and Ohio; although some of them have proved successful, none has been installed for permanent operation.

The first experiment on the Erie canal was with the Hawley method in 1893, a steam propeller being fitted with electric motors, the current for which was taken from a trolley wire on the bank. Later this method was tried again and with greater success; but the banks were threatened by the churning of the water.

Another system tried was that of Richard Lamb, who used, at Tonawanda, a telpher motor, or electric motor carriage, traveling on a permanent, suspended cableway, taking the current from the cable, and towing the boats by a line, as in horse or mule towage. Passing boats exchanged motors and went on without delay.

It was stated in 1895 that the New York state authorities had agreed to conditions by which electric power could be used from the Niagara power houses at the rate of about $20 per year per horsepower.[2]

About this time, also, the Dutton electric propeller device was recommended. This device consisted of a cable of wire on posts with a connecting trolley pole on the boat to which was attached an adjustable propelling apparatus.

In 1903 a part of the Erie canal, 2,700 feet in length, at a sharp curve near Schenectady, was set aside for equipment with the Wood system.[3] A mile of double track girder rail, one rail elevated above the other, was laid back of the towpath, and on each of these monorail tracks a towing car ran. This car was 10 feet long, 2 feet wide, and about 3 feet above the rail. It had two 22-inch grooved wheels, each driven by a 40-horsepower street car motor through a set of double reduction gears. A heavy arm extending downward was equipped with springs that caused a pair of grooved wheels to press upward on the lower rail, the springs being adjusted so that the grip of the car on the track was sufficient for any reasonable traction. The current was taken from the overhead wire through a trolley arm such as is used on mining locomotives, and controlled by a series-parallel controller with a few steps and by a resistance box located at one end of the car. The voltage was 475 or 500, and one wire served for the cars on both tracks. The boats were hauled by tow ropes attached to hooks on the body of the car. It is stated that about 600 tons were hauled without any difficulty at a speed of 4¼ miles an hour. Four loaded boats were also hauled readily at about the same speed without creating a wash injurious to the banks. No trouble was experienced in passing tows, and none was to be expected with tows handled by the monorail cars, for the greater elevation of one of the tracks would enable the tow ropes to be crossed without any difficulty, since it would be easy to hold down the trolley arm of one of the motors long enough for the other to pass. While the members of the commission before whom the experiments were conducted were satisfied with the success of the scheme, they decided that it was best to wait for the completion of the barge canal before authorizing a permanent installation.

In the summer of 1907 experiments with telpher motor towage were conducted on the Lehigh Coal and Navigation Company's canal at Mauch Chunk, Pa. Vice-President Wilbur, in a letter to the Bureau of the Census under date of May 12, 1908, wrote: "The experiments were conducted sufficiently long to demonstrate the practicability of electrical towage, and also demonstrate to our own satisfaction that if our tonnage were of sufficient volume, we would be justified in making the expenditure necessary to install the system. Until, however, our tonnage reaches substantially three times what it now is, or was last year, we would not be justified in making the necessary expenditure."

The tests were conducted by Lewis B. Stillwell and H. St. Clair Putnam, and the results are given by them in "Notes on Electric Haulage of Canal Boats."[4] One object of the experiments was to determine the relative merits, for the purpose contemplated, of locomotives supplied by trolley and operating upon a track of 42-inch gauge, and a monorail system. One section of the canal was equipped with mining locomotives weighing 8 tons and having direct current motors of 28 horsepower operating on 500 volt trolley circuits. An experimental generating plant was used as a source of power supply. Another section was fitted with a monorail supported at a height of 4 feet above the ground by steel posts outside the towpath. Several traction machines or tractors were used, the heaviest weighing 7,350 pounds with instruments and crew. The electric equipment of each machine comprised one direct current 40-horsepower motor.

Four canal boats, loaded and light, in from one-boat to four-boat tows, were used in all comparative trials. In addition, the regular canal traffic was handled by the locomotives and tractors during October and November and a part of September. The average spe-

[1] State of New York, Report of the State Engineer and Surveyor, Supplement, History of New York Canals, Vol. I, 1905, "Chronological Résumé of Laws and Events," page 972.

[2] Thomas Commerford Martin, "The Utilization of Niagara," Annual report of the Smithsonian Institution, 1896, pages 230 and 231.

[3] These statements are based upon an article in the Engineering Record, vol. 48, No. 20, November 14, 1903, page 596.

[4] Proceedings of the American Institute of Electric[illegible]merican [illegible]ny of Polit- March, 1908, page 303 ff.

which a team of mules draws a one-boat tow approximates 1.75 miles an hour, and does not exceed 2 miles in still water. If the current assists, the speed is greater; when the current is against the boats, the speed drops very low. With towing machines single boats were handled, both loaded and empty, at speeds exceeding 5 miles an hour; two-boat tows, at from 3.5 to 4 miles; and four-boat tows, up to 3 miles an hour, except on very sharp convex curves. There was comparatively little difference in efficiencies between the mining locomotive and the monorail tractor, with which comparisons were made.

Ohio had a short and partial service with an electric railway towing method on a section of the Miami and Erie canal from Cincinnati to Middletown, a distance of about 42 miles. This system was installed by the Miami and Erie Canal Transportation Company, to which Thomas N. Fordyce assigned a contract made with him for thirty years by the board of public works March 28, 1900, pursuant to an act of the general assembly, April 25, 1895. The contract was for an electrical installation for haulage purposes along the entire length of the canal from Toledo to Cincinnati, a distance of about 244 miles. Two and one-half years was the time set for the completion of the work between Cincinnati and Dayton, and four years for the construction and equipment of the entire system. These terms, it was alleged, were not complied with. The company became bankrupt, and the state brought a suit to oust it from the canal. This suit was pending in 1907.[1]

The haulage was by electric locomotives on a standard gauge track laid along the towpath, the center being about 6 feet from the water's edge and the whole track about 2 feet above the water level, so as to avoid the wash. The locomotives were of the four-wheel mining type and weighed about 55,000 pounds each, with a wheel base of 7 feet. They were equipped with two 80-horsepower induction motors, with double reduction gears, and three self-cooling oil transformers. The current was supplied by the Cincinnati Gas and Electric Company. Three-phase 60-cycle current at 4,200 volts was transmitted over the transportation company's line of two overhead trolley wires to a station five miles distant, where there were three 150 kilowatt 60-cycle oil-cooled transformers, including one in reserve. A generator at this station furnished the current to the Cincinnati section of the canal. The railway track was used for the return.[2]

CONGRESSIONAL APPROPRIATIONS.

Appropriations, except as herewith given for inland waterways, have been included in the other geographic ...ions, such action being due in most cases to the ...ability of segregating the various amounts.

Mich...
Minnes...
Montana...
North Dako...
Oregon.....
Washington....
West Virginia....
Wisconsin.....

... Attorney-General of Ohio, January 1, 1906, to ...e xi.
... on article in the Engineering Record, pre-

Lake Champlain.—The first improvements on Lake Champlain were authorized by the act of July 4, 1836, which appropriated $43,000 to be used as follows: For building a breakwater, or pier, at Burlington harbor, $10,000; for the same purpose at Plattsburg harbor, $10,000; for improving the entrance to Whitehall harbor, $8,000; and $15,000 for deepening the channel between North and South Hero islands, near St. Albans. Up to and including the act of March 2, 1907, Congress has appropriated $1,347,910 for improvements at various localities on the lake. Of this amount, 84.1 per cent was appropriated up to and including the act of September 19, 1890, and the balance since that year.

The following statement shows the Congressional appropriations made for improvements on Lake Champlain, by localities:

Congressional appropriations for the survey, improvement, and maintenance of the harbors and tributary streams of Lake Champlain, by periods and localities.

LOCALITY.	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1836	$1,347,910	$1,133,660	$211,750	$2,500
New York	1836	356,680	328,680	28,000	.....
Great Chazy river	1890	18,000	10,000	8,000	.....
Plattsburg harbor	1836	190,680	185,680	5,000	.....
Rouse Point breakwater	1884	98,500	83,500	15,000	.....
Ticonderoga river	1881	16,500	16,500	.....	.....
Whitehall harbor	1836	33,000	33,000	.....	.....
Vermont	1836	991,230	804,980	183,750	2,500
Burlington harbor	1836	699,980	582,230	117,750	.....
Gordons Landing harbor	1886	34,750	34,750	.....	.....
Lake Champlain narrows	1836	[1] 123,500	76,000	45,000	2,500
Otter creek	1872	62,500	41,500	21,000	.....
Swanton harbor	1873	70,500	70,500	.....	.....

[1] Includes $31,000, appropriated for deepening the channel near St. Albans called the "Gut."

Red River (of the North) and Warroad harbor and river.—The first appropriation for the improvement of the Red River (of the North), which is the boundary separating Minnesota from North Dakota, was made in 1876. The appropriations in the statement following include appropriations for the survey of Otter Tail lake and river and Red Lake and Red Lake river. The object of the improvement is to provide an open channel from Breckenridge to the northern boundary, 395.5 miles. Navigation is now confined to comparatively short reaches north and south of Grand Forks, and consists mainly in the transportation of wheat to Grand Forks by 2 steamboats and 12 barges. Bars have been lessened by dredging; trees, snags, and bowlders have been removed, and training dikes built.

The first appropriation for Warroad harbor and river, Minnesota, was made in 1899. The outlet of Warroad river is the only natural harbor in the United States on the Lake of the Woods, which is part of the boundary between Minnesota and Canada, and almost

wholly within the latter territory. By dredging, a minimum depth of 12 feet on the bars and of 9 feet in the inner channel has been secured. Two steamboats, 4 sailing vessels, and 2 gasoline boats made regular trips to and from Warroad during the season of 1906. There are now upward of 25 steamboats, from 10 to 500 tons capacity, navigating Lake of the Woods, the greatest stretches of which are in Canada.

The statement that follows shows the data concerning Congressional appropriations for the inland waterways mentioned here:

Congressional appropriations for the survey, improvement, and maintenance of Red River (of the North) and Warroad harbor and river.

	Date of earliest appropriation.	APPROPRIATIONS.			
		Total.	Up to and including 1890.	1891 to 1906, inclusive.	March 2, 1907.
Total	1876	$421,623	$218,000	$188,623	$15,000
Red River (of the North)	1876	338,623	218,000	[1] 105,623	15,000
Warroad harbor and river	1899	83,000	.....	83,000	.....

[1] Includes appropriations for survey of Otter Tail lake and river, and Red Lake and Red Lake river.

THE DEVELOPMENT OF INLAND WATERWAYS.

The renewed activity in connection with the improvement of inland waterways makes interesting certain expressions concerning this question when canal construction was at its height in the early part of the last century.

"The state has now 720 miles of public improvements, which, in point of extent, execution, and prospective usefulness may challenge a comparison with any other structure known to modern times," said Governor Wolf of Pennsylvania in his annual message to the legislature in 1834.[1]

"The possibilities of complete connections between the internal water systems of this country, and through them with all other portions of the outer world, are bewildering. What was actually accomplished in linking the Lakes with the Hudson exceeded all rational expectations, and if plans for connecting Philadelphia, Baltimore, and Georgetown with the Ohio river had been equally successful, the utility of canals would have been greatly increased and railway progress greatly retarded. In 1833 hopes were still cherished of the completion of the Chesapeake and Ohio canal, throughout its entire length, from Georgetown to Pittsburg, and another project, frequently discussed, for which national aid was solicited, was the construction of a national steamboat canal, which would connect the Susquehanna with an avenue leading directly to the Great Lakes."[2]

"The proposals to unite the Potomac to the Ohio, Lake Michigan to the Gulf, and Pittsburg to Lake Erie, by water, lift one into the realm of large conceptions. Yet the first was advocated by Washington, the second by Madison, and the third by Calhoun; hence, at the dawn of the twentieth century, they should not be regarded as novel."[3]

That the same, or greater, enthusiasm prevails to-day is evident. At the Deep Waterway Convention at Memphis, Tenn., October 4, 1907, President Roosevelt, in the course of a comprehensive address, said: "Facility of cheap transportation is an essential in our modern civilization, and we can not afford any longer to neglect the great highways which nature has provided for us. These natural highways, the waterways, can never be monopolized by any corporation. They belong to all the people, and it is in the power of no one to take them away."

In opening the National Rivers and Harbors Congress in Washington, D. C., the same year, Secretary Root emphasized the necessity of the proposed systems of national waterways by saying: "The railroads of the country no longer are able, physically, to carry the traffic of America, and the one avenue open to such traffic is water transportation. We must move forward or we will go backward. I see American production handicapped by two things: First, the cost of getting the goods to the seaboard; and second, the absence of an American Merchant Marine."

An Inland Waterways Commission was appointed by President Roosevelt in 1907, "to recommend a full and comprehensive plan for the development and utilization of all the natural resources of the country relating to water. Its primary purpose was to facilitate water transportation, upon which the prosperity of the country so largely depends."[4] One of the great results of this appointment was the conference of governors of states and other notable delegates at the White House in May, 1908, by request of the President.

Senator Newlands, of Nevada, who is vice-chairman of this commission, is also the author of a bill for the appointment of an official Inland Waterways Commission, with power to expend, under the direction of the President, $50,000,000 annually for the next ten years in surveys and practical work for the improvement of the country's waterways.

It is Senator Newlands' opinion that "the Ohio can be connected by canal with Lake Erie, the Mississippi with Lake Michigan, and so on; and we can connect the entire Mississippi valley, the Gulf coast, and the Atlantic coast with each other by a system of sheltered waterways along the Gulf and Atlantic coasts * * * consisting of bays, sounds, and rivers to be connected

[1] Mitchell's Compendium of Canals and Railroads, 1835, page 34.
[2] J. L. Ringwalt, "Development of Transportation in the United States," page 51.
[3] Forestry and Irrigation, January, 1908, pages 8 and 9.
[4] Hon. Francis G. Newlands, "Use and Development of American Waterways," in American Waterways, American Academy of Political and Social Science, January, 1908, page 49.

with each other by canals, such as the contemplated canal across Florida, connecting the Gulf with the Atlantic coast, the canal connecting the Carolina sounds with Chesapeake bay, the canal connecting Chesapeake bay with the Delaware river, the canal connecting the Delaware river with the Raritan, and the canal across Cape Cod, thus giving a sheltered waterway from the mouth of the Mississippi to Maine, upon which it is possible that boats of standard draft could pass from Boston down the Atlantic coast, across Florida to the Gulf coast, and up the Mississippi to the Great Lakes. If these things were done, and warfare between the railways and waterways should continue, there would still be sufficient transportation, without the distributing aid of the railways, to constitute a very influential part of the commerce of the country."[1]

The country has been divided into four systems:

(1) The Atlantic Interior, comprising all territory east of the Rocky mountains.

The chief projects here are the building of one vast waterway of canals and canalized rivers from the Great Lakes to the Gulf of Mexico; and another from Boston by the Cape Cod canal, now under construction by private citizens, through Long Island Sound, New Jersey, Delaware, Virginia, Maryland, North Carolina, South Carolina, and Georgia, to the Florida rivers. Many of the connecting links are old canals and canalized rivers. Besides this, rivers and neglected streams from Maine to Texas, including the Mississippi to its headwaters and its great tributaries, are to be improved. An inner passage, also, is planned to extend from the Mississippi to the Rio Grande, and another from the Mississippi to Florida. Canals are also to connect the Great Lakes with the upper Mississippi and the Ohio, and the canal now building under private auspices from Ashtabula, Ohio, to Pittsburg, Pa., is to be completed. Among the propositions for this system are the union of Toledo with Cincinnati by a deep waterway, the joining of Toledo with Chicago by means of a barge canal, the connection of Chicago with New York by way of the Great Lakes, the Erie canal, and the Hudson, and even the junction of New York with Puget Sound. The connection of the Mississippi, Ohio, and Tennessee rivers with the Coosa, Ocmulgee, and Altamaha, thus uniting the Ohio and Mississippi systems with our southeastern coast waters at Mobile and Brunswick, respectively, is another project.

(2) The Columbia-Puget, with the improvement of the Columbia, Willamette, and Snake rivers, where much work has already been done by Federal and state governments.

(3) The California, involving principally the canalization of the San Joaquin and the Sacramento rivers.

(4) The Colorado river, with extensive projects principally for irrigation.

It is of interest to note what is being done or projected of superior importance in the various states, whether by Federal, state, or private enterprise, in the construction and improvement of inland waterways of all kinds. Statements concerning Federal enterprises are taken largely from the reports of the Chief of Engineers, U. S. Army.

NORTH ATLANTIC DIVISION.

Massachusetts.—The passage around Cape Cod is the great highway for the commerce between the northeastern and southern ports, and for many foreign vessels which touch at Boston, bound to or from New York. The idea of a canal across Cape Cod is a very old one, and as early as 1676 a cut through the peninsula was considered; although numerous surveys for a canal have been made, no actual work was ever accomplished until recently. The Boston, Cape Cod, and New York Canal Company has recently been chartered and proposes to cut a canal, without locks, 250 to 500 feet wide, and 25 feet deep at low water, across Cape Cod from Barnstable bay to Buzzards bay, a distance of 8 miles. As estimated, the cost of this waterway will be about $10,000,000, and the expectation is that it will be completed in the fall of 1911. The proposed canal will shorten the distance between Boston and New York, and eliminate the great danger from marine disaster to vessels passing around the cape.

New York.—One of the most noteworthy projects in artificial waterways is the enlargement of the Erie, Oswego, and Champlain canals, all located within, and owned and operated by, the state of New York. The expenditure for this improvement of $101,000,000, which will be the cost according to the estimates of the state engineer and surveyor, was authorized by a vote of the people at a general election. More than one-half of the new water routes will be through river channels and lakes, and the canal work involves the construction of entirely new channels and locks, in many places along different routes from the present canal.[2]

On the principal route, or the Erie canal, from Lake Erie to the Hudson river, the new channel will follow the line of the old canal, in the main, from the Niagara river at Tonawanda to the neighborhood of Lyons. Thence it will take a new route to the south of the Montezuma marshes, and in the Seneca and Oneida rivers and across Oneida Lake. Thence it will cross to the Mohawk river, west of Rome, and utilize the bed of that river for most of the distance to Waterford on the Hudson. The new route will remove the canal from the business districts of Rochester and Syracuse, and at the same time furnish each of these cities with larger and better facilities for water traffic in the Genesee river and Lake Onondaga. The most important changes of level will be at Lockport and Waterford. At the former a flight of 2 locks will replace the 5 now in use; and at the latter 5 locks, with a fall of 34 feet each, will take the place of the 16 in the neighborhood of Cohoes, on the old canal.

[1] Hon. Francis G. Newlands, "Use and Development of American Waterways," in American Waterways, American Academy of Political and Social Science, January, 1908, pages 55 and 56.

[2] John A. Fairlie, "New York Canals," in American Waterways, page 121.

In addition to this main line, the Oswego river will be canalized from its junction with the Erie canal route to Lake Ontario, furnishing a waterway from that lake to the Hudson with only 35 miles of canal. The Hudson river will also be made navigable from Troy to Fort Edward; and from there a new channel will follow the line of the Champlain canal to the lake of that name.

Work on the general project is already under way, but it is not expected that it can be finished in less than six years. When the improvement is finished, the canals are to have a minimum depth of 12 feet and a minimum bottom width of 75 feet, except when they pass through rivers or lakes, when the minimum bottom width shall be 200 feet. The locks, which are the principal factors in limiting the size of the vessels, will be 328 feet in length and 45 feet in width. These will permit the passage at one time of 2 boats, each 150 feet long and 42 feet wide, drawing 10 feet of water, and having a capacity of 1,500 tons; and such barges will be the most economical unit for transportation on the new routes. The size of the barges and the location of so much of the new routes in open water courses will involve the disappearance of the primitive system of horse towage, and will make necessary the use of steam or other mechanical motive power. It is expected that vessels will usually go in fleets of 4, one steamer towing 3 barges, and under these conditions it is estimated that the trip from Buffalo to New York can be made in five days, in place of ten days, as at present.[1]

The Rochester Chamber of Commerce, in pursuance of another project of improvement in waterways, resolved on December 2, 1907, that "the proposed 'Rochester, Pittsburg and New Orleans Waterway,' or 'The Middle Route from Lake Ontario to the Gulf of Mexico,' is worthy of careful consideration." This route was described by J. T. McClintock, county engineer of Monroe county, N. Y.,[2] who said: "It is possible to build a waterway 12 feet deep from Lake Ontario up the bed of the Genesee river, over the divide at Cuba and down the Allegheny river to Pittsburg, where it will connect with the Ohio, and then the Mississippi river to the Gulf of Mexico. The total length from Lake Ontario to New Orleans will be about 2,308 miles, and to Pittsburg 360 miles. It is apparent from information we now have that 35 locks or lifts would be sufficient to reach Pittsburg * * *. Mechanical lifts have been perfected which permit of boats being raised or lowered 100 feet or more at one lock."

New Jersey.—The Raritan river is 10 feet deep for 12 miles from its mouth to New Brunswick. Both New Jersey and Delaware have profited by the improvement of the Delaware river as far as Philadelphia. A 30-foot depth to Trenton is projected.

Pennsylvania.—A ship canal to connect Pittsburg with Lake Erie is probably one of the most important projects now receiving attention. The Lake Erie and Ohio Ship Canal Company has been granted permission by Congress to construct a canal 13 feet deep, with a surface width of 177 feet, from Beaver, Pa., on the Ohio river, to Ashtabula, Ohio, on Lake Erie. The total length of this waterway is to be 103 miles, of which nearly one-half will be formed by the canalization of rivers tributary to the Ohio river. It will require from 25 to 30 locks, 400 feet long by 56 feet wide, to overcome the rise to or the fall from the summit level of the canal. It is estimated that the original cost will be $50,000,000, and that it will take five years to complete the canal after construction work has commenced. When complete it will be possible for lake vessels to carry iron ore direct from the Lake Superior mines to the furnaces along the route of the canal, and for coal to be shipped from western Pennsylvania mines to upper lake ports by an all-water route. It has been estimated that the annual traffic through the canal will not be less than 18,000,000 tons, or about one-third of the annual tonnage through St. Marys canal, and that there will be a great saving on iron, coal, and coke, the commodities whose tonnage will constitute the greater part of that through the canal. Steam whaleback vessels of the type now in use on the Great Lakes can easily pass through the canal to Pittsburg.

The Ohio river from Pittsburg, Pa., to its mouth in the Mississippi river, near Cairo, Ill., has a length of about 1,000 miles. Since 1825 the Federal Government has been at work on this river securing additional depths at islands and bars by the construction of low dams, by building dikes where the river was wide and shallow, by dredging, and by the removal of rocks and snags. In 1875–76 Congress first approved of the project of canalizing the upper part of the river to secure a low-water depth of 6 feet, by the construction of locks and dams, the first of the locks, located at Davis Island, 5 miles below Pittsburg, being completed in 1885. The next lock to be completed is located at Beaver, Pa., 29.5 miles below Pittsburg, and was placed in operation in 1904, and another lock, located between Davis Island and Beaver, was completed in 1906. At the present time the accepted project is for 6-foot navigation from Pittsburg to Aurora, Ind., just below Cincinnati, about 500 miles down the river, and contemplates the construction of 32 additional locks, of which 7 are now being constructed. To complete the canalization of the Ohio to its mouth at Cairo, Ill., would require 30 additional locks. Around the Falls of the Ohio at Louisville, Ky., about 396 miles below Pittsburg, is the Louisville and Portland canal, about 2.4 miles long, with 4 locks. This canal has been in operation for many years. The United States Government has already expended over $15,000,000 on the improvement of the Ohio, and it will take between

[1] John A. Fairlie, "New York Canals," in American Waterways, pages 122 and 123.

[2] "Waterways Development," in Proceedings of Rochester Chamber of Commerce at the regular meeting, December 2, 1907, page 14 ff.

$25,000,000 and $30,000,000 more to complete the canalization of this river.

The Allegheny and the Monongahela rivers form the Ohio river. The Allegheny has ample width and volume for the purpose of slack-water improvement. Three locks between Pittsburg and Natrona, a distance of about 24 miles, have already been constructed, and a project has been submitted to canalize the river from its mouth to the state line, by the construction of 54 additional locks, at an estimated cost of about $13,500,000. The project, however, is to extend slack-water navigation only to Monterey, about 80 miles above Pittsburg, by the construction of 8 additional locks and dams at an estimated cost of about $2,500,000.

The improvement of the Monongahela river in Pennsylvania extends from Pittsburg to the mouth of Dunkard's creek, a distance of 87.5 miles. This makes the waterway of great use to the coal fleets, which are accustomed to wait in Pittsburg harbor for the rise in the Ohio, in order that they can proceed to points on that river and on the lower Mississippi. Several packet lines ply on the Monongahela, Ohio, and Allegheny rivers. This system of inland waterways is one of the busiest in the United States.

Another important undertaking is thus outlined: "As a link in the chain of deep waterways from Boston to Beaufort, the Delaware is of first importance. Its 30-foot channel from Philadelphia to deep water in Delaware bay will be ample until other links in the chain have been completed, and by that time it will have been further deepened. The proposed Delaware and Chesapeake Ship canal will at once put Philadelphia in communication with numerous important points on Chesapeake bay and its tributaries. The extension northward to Raritan bay involves not only the building of a ship canal, but extensive improvements in the river itself, for the channel north of Philadelphia is only 9 feet deep the greater part of the way to Bordentown. Southward from Philadelphia, to whatever point may be selected as an outlet to the Delaware and Chesapeake canal, the Delaware river is already an ample waterway for the purposes of the proposed continuous inland route. The immediate demand is for the completion of the 30-foot channel from Philadelphia to the sea; then for a survey of 35 feet, which is necessary to accommodate vessels of increased draft."[1]

SOUTH ATLANTIC DIVISION.

Delaware.—In 1901 the legislature of this state authorized the expenditure of $60,000 toward the improvement of the Christiana river at Wilmington. The entire amount has been expended and the project toward which it was applied has been completed. The state is much interested in the improvement of the Delaware river, which is described in connection with the waterways of Pennsylvania.

Maryland.—The Susquehanna river is navigable for 5 miles from its mouth, and the Patapsco for 11 miles to Baltimore. The Government has done much work on these waterways. Chesapeake bay and Baltimore harbor also have been improved. The Potomac river has a 24-foot depth to Washington. The Chesapeake and Ohio canal has been controlled since 1890 by a board of trustees appointed by the court in the interest of bondholders under the mortgage of 1844. Its traffic tonnage is almost altogether that of coal.

District of Columbia.—The Federal Government has improved the Potomac above and below Washington. The Potomac is navigable to the foot of Little Falls.

Virginia.—In Virginia the York river is 21 feet deep to West Point, a distance of 45 miles; the Rappahannock has a depth of 9 feet for 106 miles, and the James 100 miles of 17-foot channel to Richmond. The Mattapony, the Pamunkey, and the Nansemond are being improved.

West Virginia.—Slack-water navigation on the Little Kanawha river extends from its mouth at Parkersburg to Creston, a distance of 48 miles, and provides a depth of 4 feet. Four of the 5 locks now in operation were constructed by the Little Kanawha Navigation Company between 1867 and 1874, and afford slack-water navigation from Parkersburg to Spring Creek, a distance of 43 miles. The Federal Government built a lock 2 miles above Burning Springs, and it was opened to navigation in 1891. In 1905 the Federal Government purchased the navigation company's locks, and it is now proposed to continue the canalization of this river to Bulltown, about 130 miles above Parkersburg, by the construction of 11 additional locks.

The Great Kanawha river flows through a region rich in mineral wealth, especially coal. The original project for the canalization of this river was adopted in 1873, and the modified project in 1875, and the river is now canalized from Point Pleasant, where it empties into the Ohio river, to Loup Creek shoals, about 90 miles above the mouth. There are 10 locks and dams, 2 of the dams being fixed and 8 movable. The first lock and dam in this system were put in operation in 1880, and the last in 1898. Since the improvement there has been a large increase in the commerce of this river.

Before the Monongahela river in West Virginia was improved, at high water steamboat navigation was practicable only as far upstream as Morgantown. Occasionally a boat would go to Fairmont. The canalization and other improvements finished in 1899 furnished a channel 5.2 feet deep at low water as far as Morgantown. The completion later of 6 locks and dams extended slack-water navigation about 28 miles, from Morgantown to a point on the West Fork river 4 miles above Fairmont, with a minimum navigable

[1] Hon. J. Hampton Moore, M. C., "Delaware River," in American Waterways, pages 71 and 72.

depth of 7 feet. The Chief of Engineer's report, 1907, advises that "the improvement should enable the people of the territory affected to transport coal, general freight, etc., almost uninterruptedly to market." A daily line of packets plies the river between Pittsburg, Pa., and Fairmont, W. Va., and towboats run as often as required.

North Carolina.—The aim of the Federal Government is to make a channel 5 feet in depth on the Roanoke from its mouth to Weldon, a distance of 129 miles. The Tar has a channel 3 feet deep for 22 miles. The Neuse and Trent are said to be navigable to Smithfield, a distance of 150 miles, and it is expected that they will be deepened until they have a channel of 3 feet. The Cape Fear river is to be canalized and made 8 feet deep to Fayetteville, a distance of 115 miles.

South Carolina.—In this state the principal rivers are the Waccamaw and the Little Peedee, which are fairly deep for 50 miles and only 2 or 3 feet in depth for 50 miles more; the Santee, with its tributaries; the Congaree and the Wateree; and the Peedee; all of which the Appalachian Forest Reservoir system would make navigable for river steamers. Work on these waterways has been progressing for the last two or three decades.

Georgia.—The Coosa river is formed at Rome, Ga., by the junction of the Oostenaula and Etowah rivers, which have their sources in northern Georgia. The Oostenaula is formed by the junction of the Coosawattee and Connesauga rivers, 56 miles northwest of Rome. The Oostenaula and the Coosawattee are navigable for light-draft boats during nine months of the year for a distance of about 105 miles, but the Etowah and Connesauga are not navigable. The Coosa river has always been navigable for light-draft boats from Rome, Ga., to Greenport, Ala., an estimated distance of 162 miles, and this part of the river is of such a character as to make its improvement by works of contraction and channel excavation entirely practicable, except at Horseleg shoals, near Rome, where a lock of low lift will ultimately be required. From Greenport to Wetumpka, Ala., a distance of 142 miles, locks and dams are required in conjunction with works of contraction and channel excavation to provide for navigation. From Wetumpka to the junction of the Tallapoosa the river is navigable at all seasons. Various examinations and estimates for the improvement of parts of this river between Rome and Wetumpka were made up to the time of the adoption of the existing project. This project provides for a lock with excavation for a 4-foot channel between Rome and Wills creek in Alabama; for 3 locks between Greenport and Whisenant and Ten Island shoals, with an extreme low-water depth of 4 feet on miter sills, together with a 3-foot channel between locks 1 and 3; for 5 locks and dams from and including lock 4 to the East Tennessee, Virginia, and Georgia Railroad bridge, with an extreme low-water depth of 6 feet over the miter sill, together with a connecting channel 100 feet wide and 4 feet deep at extreme low water; and for 23 locks and dams, with 6 feet over the miter sills, between the East Tennessee, Virginia, and Georgia Railroad bridge and Wetumpka. In addition, the channel is to be cleared of various rock reefs and points, so as to give a minimum depth of 4 feet. The cost of these improvements is estimated at about $7,000,000. Three locks below Greenport have been built and lock 4, about 26 miles below, is under construction.

Georgia is to be one of the great beneficiaries of a projected inner canal from Cairo, Ky., to Brunswick and Savannah. A bill involving the appropriation of $75,000 for a survey of this great canal has already passed the United States Senate.

Florida.—The St. Johns river is navigable 276 miles to Lake Washington, and is 13 feet deep to Palatka. The Ocklawaha, the Kissimmee, the Caloosahatchee, the Suwanee, and the Withlacoochee also are in a projected scheme of improvement. Across the western part of the state runs the Apalachicola, navigable for its entire length of 137 miles, and leading up into the Chattahoochee and the Flint.

NORTH CENTRAL DIVISION.

Ohio.—The general assembly of Ohio recently authorized the improvement of the Miami and Erie canal, which extends from Toledo on Lake Erie to the Ohio river at Cincinnati. Previously an appropriation had been made for the enlargement of the Ohio and Erie canal between Cleveland and Dresden. The enlarged canal will have a depth of 12 feet and a width on bottom of 75 feet. The enlarged locks will be 300 feet long by 28 feet wide and have a minimum depth over the miter sill of 11 feet. The estimated cost of all these improvements is $3,000,000.

Under date of August 21, 1907, Chief Engineer Charles E. Perkins wrote to the Bureau of the Census:

"The legislature of this state has had under consideration for a number of years the improvement of its canal system, which at last resulted in an act passed April 25, 1904, 'to provide for a continuing appropriation for the improvement of the Northern Division of the Ohio and Erie canal between Cleveland and Dresden on the Muskingum slack-water improvement, a distance of 150 miles.' (See Laws of Ohio, vol. 97, page 578.) This policy since that time has been directed to the improvement of the entire Miami and Erie canal between Cincinnati and Toledo, including what is known as the Sidney feeder, a distance for the main canal of 244 miles and for the Sidney feeder of 14 miles. * * * The improvements will increase the hauling on the canals, net tons per boat, from 70 to 115. The improvement contemplates the restoration of the balance of the Miami and Erie canal from Dayton to Toledo, as it was originally built, providing for a canal prism 5 feet deep by 50 feet in width in the minimum between Dayton

and Defiance, and 60 feet in width and 6 feet deep between Defiance and Toledo. The estimated cost for improvement is practically $1,000,000 for the Ohio canal between Cleveland and Dresden and $2,000,000 for the improvement of the Miami and Erie canal." The state has already made an appropriation of $706,000 for these improvements, besides a number of minor appropriations for repairs to some of the old structures.

In a report urging the improvement of the canals, the chief engineer of public works set forth the importance of the work as follows:

"The General Government, by act of Congress, has practically recognized the commercial value of the Muskingum river improvement from Marietta on the Ohio to Zanesville, by the adoption of it as a public work, and will undoubtedly extend the improvement north as far as Dresden or Coshocton, thus providing and maintaining a waterway nearly half way across the state; and as the improvement of the Ohio canal from the terminus of the Muskingum improvement to Lake Erie would form an integral part of that great waterway and would be of joint utility with it, it would appear that it would be advisable to improve this portion of the Ohio canal, and by induction a favorable decision can be reached regarding the entire canal system. A cursory comparison of the commercial possibilities of the Muskingum improvement below either Coshocton or Zanesville with those of the Ohio canal from those points to the lake, and with the commercial possibilities of the Miami and Erie canal, with its much greater population of the territory and its more extensive industrial resources, would make the argument for the improvement of the entire canal system more forcible. In determining a future policy to be adopted for the canals of Ohio, the fact should not be overlooked that the Great Lakes bordering the state of Ohio on the north and the Ohio river bordering it on the south, rank, in the magnitude of their commerce, first and third, respectively, among the waterways and common carriers of the United States." [1]

Indiana.—At the time the United States began the work of improving the Wabash river the waterway was badly obstructed by bars, accumulations of snags, rocky reefs, and numerous secondary channels or cutoffs, which lessened the flow of water through the main channel. Navigation was impracticable except at high stages of water. A lock and dam were built at Grand Rapids by the Wabash Navigation Company in 1848 and a few improvements made at other places, also by private enterprise; but as none was of a substantial character, they rapidly deteriorated and became useless. The original project proposed the improvement of the river from its mouth to Lafayette by the general work of snagging and dredging, by special works at designated localities, and by the construction of a new lock and dam at Grand Rapids, which were opened to navigation in 1893.

Illinois.—The Chicago Drainage and Ship canal is one of the most important canals opened to navigation since 1889. This canal was built by the city of Chicago for the purpose of giving that city proper drainage facilities by reversing the movement of the water, which formerly flowed into Lake Michigan through the Chicago river, and turning a current from the lake through the Chicago river to the Illinois river at Lockport, and thence to the Mississippi river. The canal proper extends from Robey street, where it joins the Chicago river, to Lockport, a distance of 28 miles, and with the 6 miles of the Chicago river from Robey street to Lake Michigan this waterway has a total length of 34 miles. The minimum depth of the canal is 22 feet; its average width on bottom, 158 feet; and the average width at top, 244 feet. The work was commenced in 1892 and water was turned into the channel in 1900. The controlling work, consisting of a bear-trap dam 160 feet wide, with a vertical play of 17 feet, and 7 sluice gates, each 30 feet wide and having a vertical play of 20 feet, are located near Lockport. The canal cost about $52,000,000, including rights of way; bridges, all of which are movable structures; excavations, etc. It has been proposed to Congress to make this canal a commercial highway by increasing the channel depth of the Illinois and Mississippi rivers to 14 feet, with locks for fleets of barges from Lockport, the terminus of the canal, to St. Louis. This, it is argued, would afford through water transportation from Lake Michigan to the Gulf of Mexico via the drainage canal, the Illinois river, and the Mississippi river. The Chicago Sanitary District, which is the owner of the canal, offers to turn it over to the Government as a part of the greater project.

The Illinois and Mississippi canal, which is being constructed by the Federal Government, was begun in 1892, and the 3 locks and 4.5 miles of canal around the rapids of the lower Rock river at Milan were completed and opened to navigation in 1895. This canal is to extend from a short distance above Hennepin, via Bureau Creek valley and over the summit to Rock river at the mouth of Green river; thence by slack water in Rock river to the canal at Milan, and from that point to the Mississippi river at the mouth of Rock river. The canal will be about 75 miles long, at least 80 feet wide at the water surface, and 7 feet deep. There will be 33 locks, each 170 feet long by 35 feet wide. There will also be a feeder line 29 miles long. Up to the close of the fiscal year 1906, $6,920,941 had been expended on this project. With the completion of this canal in 1907 a 7-foot waterway has been afforded from the Mississippi river to Lake Michigan via the Illinois and Mississippi canal, the Illinois river, and the Chicago Drainage and Ship canal.

Of the many projects now before Congress, that of a

[1] Report of Chief Engineer of The Public Works of Ohio, 1903, page 52.

14-foot waterway connecting Lake Michigan with the Mississippi river via the Illinois river, and thence to St. Louis, a distance of about 365 miles, is one of the greatest. It is proposed to canalize the Illinois river from Lockport to Utica by 9 locks, 600 feet long and 80 feet wide, and 5 new movable dams, and to utilize the open river from Utica to Grafton, at the mouth of the Illinois river, by removing the 4 existing dams and dredging a channel 200 feet wide on the bottom. At Lockport the Illinois river will be connected with the Chicago Drainage and Ship canal. At Joliet and Marseilles there will be lateral canals each 3 miles long.

Michigan.—A history of the St. Marys canal—now a Federal Government undertaking—down to 1880 was contained in the report on canals for the Tenth Census. Since that report, however, the 2 old state locks have been destroyed to make room for the Poe lock, which was completed in 1897. This lock is 800 feet long, 100 feet wide, and has 22 feet of water over the sills. The canal was lengthened from 1.02 miles in 1880 to 1.6 miles in 1906. It has a depth of 25 feet. As a result of the large increase in tonnage transported through this canal the Fifty-ninth Congress authorized the construction of still another lock. The new lock will lie north of the Poe lock, will be 1,350 feet long and 80 feet wide, and will have a minimum depth of 24.5 feet. A new canal approach is also to be constructed, which will be from 260 to 300 feet wide. The estimated cost is $6,200,000, of which $1,200,000 has already been appropriated, with authority from the Secretary of War to enter into contract for an additional sum not to exceed $5,000,000.

Wisconsin.—The Fox and Wisconsin rivers are only 2 miles apart at Portage; one flows into Lake Michigan and the other into the Mississippi. The headwaters are connected by a short canal known as the Portage canal. The Fox river is canalized from Lake Winnebago to Green bay. The Sturgeon Bay and Lake Michigan canal, extending from the bay to the lake, is almost 1¾ miles long. It was originally built by a private company, but was assumed by the Federal Government in 1893. The improvement of these and other waterways in the state continues with little interruption.

Minnesota and North Dakota.—The Red River (of the North) rises in Lake Traverse and, flowing north, empties into Hudson bay. It was a steamer route until railways were built, and has 2 feet of water below Grand Forks, and 18 inches from Moorhead to Fargo. Navigation is confined to short reaches north and south of Grand Forks. The Minnesota river, which empties into the Mississippi at St. Paul, is partly navigable for from 40 to 80 miles above that city. A writer suggests a great artificial waterway from St. Paul up the Minnesota, through the two lakes and down the Red River (of the North), to make the Canadian waterway system a part of ours, and to offer the Canadian wheat growers cheap transportation to the mills and elevators of Minneapolis.[1]

Missouri.—The improvement of the Missouri river from Kansas City and St. Louis to a low-water depth of 12 feet is deemed perfectly practicable. Government engineers estimate the cost of a 14-foot channel to be $20,000,000. If the river were improved with a 12-foot channel to Sioux City, Iowa, the cost as estimated would be $20,000,000 more. This work would open a direct waterway to New York city via the Mississippi, the deepened Illinois, the Chicago Drainage and Ship canal, the Great Lakes, and the Erie barge canal. The Missouri river was first navigated by steamboats in 1819, but commerce has been diverted to other channels. There are signs of revival, however; a line of freight and passenger boats is making regular trips between Kansas City and St. Louis. Over $11,000,000 have been expended on the Missouri river by the Federal Government. It is asserted that no permanent good to navigation can be accomplished by efforts in scattered localities; but no project for the improvement of the river as a whole has yet been adopted.

The White river in its original condition was much choked by logs, snags, and drift in its lower reaches in Arkansas, and by shoals, bowlders, and snags in its upper reaches above Jacksonport. The original project of 1871 was to remove snags and similar obstructions, the improvement being subsequently extended to Forsyth, the object being to obtain a channel 5 feet deep at low water from the mouth at Newport, Ark., and 2 feet deep from Newport to Buffalo shoals. The existing project for the improvement of the upper White river by locks and dams is to provide slackwater navigation from Batesville, Ark., to Buffalo shoals, a distance of 89 miles, by 10 locks and dams, the locks to be 175 feet long by 36 feet wide, with a depth of about 4 feet on the lower miter sills. Two of these locks have been completed and are in operation. The further construction of locks and dams on this river is not considered desirable at the present time. The head of steamboat navigation is Forsyth, 505 miles from the mouth of the White river.

SOUTH CENTRAL DIVISION.

Kentucky.—The Tennessee river is 652 miles long, and is formed by the junction of the French Broad and Holston rivers, 4.5 miles above Knoxville and 188 miles above Chattanooga. It flows into the Ohio river at Paducah, Ky., 464 miles below Chattanooga. Together with its principal tributaries it forms a system of internal waterways navigable by steamboats for more than 1,300 miles. By means of training walls, wing dams, and dredging, a low-water channel 3 feet deep is projected above Chattanooga to the

[1] Herbert Quick, "Inland Waterways," in Putnam's and the Reader, May, 1908, page 194.

mouth of the French Broad river. Between Chattanooga and Riverton, Ala., a lateral canal, 18 miles in length with 11 locks, has been constructed around the Elk river and Big Muscle shoals. A lock is being built at Hales bar, about 33 miles below Chattanooga, and a lateral canal 8 miles in length with 1 lock is under construction at the Colbert and Bee Tree shoals, between Florence and Riverton, Ala. From Riverton to Paducah, Ky., where the Tennessee empties into the Ohio, a 5-foot channel is being dredged.

The Cumberland river rises in eastern Kentucky, flows in a tortuous course of about 688 miles through eastern Kentucky, middle Tennessee, and western Kentucky, and empties into the Ohio river near Smithland, Ky. The project for the canalization of this river contemplates the construction of 35 locks and dams so as to afford 6-foot navigation from the mouth of the Rockcastle river, 32 miles above Burnside, Ky., to Smithland, a distance of 550 miles. Of these locks and dams, 6 are to be at Smith shoals above Burnside; 22 between Burnside and Nashville, Tenn.; and 7 between Nashville and Smithland. Two of the locks below Nashville and one above are completed. The river is now canalized from a point 41.5 miles below Nashville to 26 miles above. The estimated cost of the entire work is about $10,000,000.

The Big Sandy river is formed by the confluence of the Levisa and the Tug forks at Louisa, Ky., 26 miles from where it empties into the Ohio river at Catlettsburg, Ky. The accepted project for the improvement of this river contemplates its canalization to Louisa by means of 3 locks and dams. This project also includes the canalization of Levisa Fork up to Pikeville, Ky., 86.5 miles above Louisa, by means of 10 locks and dams, and Tug Fork up to Pond creek, Ky., 27 miles above Louisa, by means of 8 locks and dams. The 3 locks and dams on the Big Sandy river below Louisa are now in operation, and the first lock on each of the two forks is under construction. The estimated cost of this project is about $5,000,000.

The Kentucky river empties into the Ohio river at Carrollton, Ky., about midway between Cincinnati and Louisville. From 1835 to 1839 the state of Kentucky improved the stream by constructing 5 locks and dams, which afforded slack-water navigation for about 95 miles from its mouth. In 1880 jurisdiction over this river was ceded to the Federal Government, and the accepted project for its improvement was to extend 6-foot slack water from its mouth to the Three Forks, a distance of about 261 miles, by the rebuilding of the old state locks and the construction of 9 additional locks. Of this work, the old locks have been rebuilt and 6 new locks constructed and put in operation. Navigation now extends to Irvine, Ky., about 226 miles from the mouth.

The Green river empties into the Ohio river about midway between Evansville and Newburg, Ind. The Barren river empties into the Green river about 145 miles above the mouth of the latter stream. The state of Kentucky improved these streams, during the period from 1833 to 1841, by constructing 4 locks and dams on the Green river and 1 lock and dam on the Barren river, which work permitted continuous navigation from the mouth of the Green river to Bowling Green, Ky., on the Barren river, a distance of about 175 miles. In 1888 the Federal Government assumed control, and in accordance with the accepted project rebuilt the 5 old state locks and constructed 2 new locks on the Green river. The completion of this work permits through navigation for boats not exceeding 5 feet draft from the mouth of the Green river to Mammoth Cave, Ky., a distance of about 193 miles, and to Bowling Green, Ky., on the Barren river, a distance of about 175 miles from where the Green river empties into the Ohio river, and affords transportation facilities to the rich mineral district bordering on these streams. Slack-water navigation can be extended to the mouth of Little Barren river, about 50 miles above Mammoth Cave, by the construction of 6 more locks and dams, and to Ray's Fork on the Barren river, about 24 miles above Bowling Green, by means of 2 additional locks and dams.

The Rough river empties into the Green river at Livermore, Ky., about 70 miles above the mouth of that river. Shortly after the Civil War the Rough Creek Navigation and Manufacturing Company built a lock and dam about 7 miles above Livermore which afforded slack-water navigation throughout the year to Hartford, Ky., about 29.5 miles above the mouth of Rough river. When the Federal Government undertook, in 1894, the construction of a lock on this stream, the old lock and dam had been abandoned and were completely in ruins. While the accepted project for the improvement of this river contemplated only the extension of slack-water navigation to Hartford by the construction of one lock and dam, which were completed and in operation in December, 1896, the improvement could be extended to Green's Dam, 81 miles from the mouth, by the construction of 4 additional locks and dams.

Alabama.—The Black Warrior, Warrior, and Tombigbee rivers, together with the Mobile river, connect the Warrior coal fields with the Gulf of Mexico. The Black Warrior is formed by the junction of the Mulberry and Locust forks, 46.5 miles above Tuscaloosa, where the name changes to Warrior river. The Warrior river flows into the Tombigbee river about 1 mile above Demopolis, which is 185 miles above the mouth of the Tombigbee river. The total length of these rivers from Mulberry and Locust forks to the mouth of the Tombigbee river is about 365 miles. Previous to improvement the Tombigbee river was navigable for light-draft vessels to Demopolis for about nine months annually, and the Warrior to Tuscaloosa for about four months annually. Tuscaloosa was considered the head of navigation. Rafts and flatboats were

brought down the Black Warrior river on floods, but there was no other navigation on this stream. The improvement of the Tombigbee began in 1872, under a project for the removal of snags, logs, and other obstructions, with a view to obtaining a channel of an available depth of from 3 to 4 feet. Work was carried on under this and modified projects for a number of years. During the progress of the work it became apparent that this method of improvement was inadequate, as a greater depth was demanded for the transportation of coal from the Warrior fields to the sea. In 1884 a 6-foot slack-water project was inaugurated for the Black Warrior river in the vicinity of Tuscaloosa. This project has been gradually extended, and now embraces the Tombigbee river from its mouth to Demopolis, the Warrior river from Demopolis to Tuscaloosa, and the Black Warrior from Tuscaloosa to Mulberry and Locust forks. Upon the Tombigbee river the 3 required locks have been partially constructed, and of the 6 locks planned for the Warrior river, 3 have been completed and the balance are under construction. Of the 11 locks required upon the Black Warrior river, 4 have been completed and 2 more are under construction. The Fifty-ninth Congress appropriated $350,000 toward the completion of the improvements on these rivers and gave the Secretary of War authority to enter into contracts for a sum not to exceed $1,842,000, to be hereafter appropriated.

At the Muscle Shoals canal a railroad nearly 15 miles in length is operated in connection with its maintenance. A bucket dredge is kept on the canal to remove bars as fast as they are formed by the inrush of 15 streams.

Mississippi.—The rivers, harbors, and passes of the state have been improved regularly, but there are no canals or canalized rivers.

Louisiana and Arkansas.—The mouths of the Mississippi furnish a notable system of internal waterways. The principal stream has a depth suitable for ocean shipping for hundreds of miles, or to the mouth of the Red river. There are also bayous stretching to the westward through plantations where steamers can load with sugar cane, rice, cotton, etc. A number of private ship canals are also a part of this system of inland communication. One of these is the Barataria and Lafourche canal, known as the company's canal. It extends from the Mississippi opposite New Orleans to the Atchafalaya river at Morgan City, running through 5 parishes and crossing or connecting with 23 navigable streams or lakes. Several of the bayous and rivers of the state are under improvement by the Federal Government.

The improvement of the Ouachita river by the United States commenced in 1871. At that time navigation was much obstructed at all stages, and the greater part of the river was navigable at low water. The project of 1871 contemplated temporary improvement from Trinity, La., to Arkadelphia, Ark., by removal of snags, etc., and by dredging the worst bars. In 1872 a project was adopted for locks and dams to give a depth of 4 feet from Trinity to Camden, Ark., but this project was abandoned two years later. The project under which work continued after 1874 contemplated the removal of obstructions below Camden, Ark. The 56 miles known as Black river, below Trinity to Red river, La., were added to the project in 1884. The existing project, besides including a continuation of the snagging work, contemplates the construction of 9 locks and movable dams, to afford a navigable depth of 6.5 feet from the mouth of Black river, La., upstream to a point 10 miles above Camden, Ark., a distance of 360 miles. The rivers and harbors act of June 13, 1902, authorized the building of a lock and dam near Monroe, La., 183 miles above the mouth of the river, and a lock and dam near Roland Raft, Ark., 238.5 miles above the mouth. At moderately high stages, or for 6 or 7 months of the year, New Orleans steamboats ascend the river to Camden, Ark.; at medium stages they run to Monroe, La.; but during the periods of low water Harrisonburg, La., is considered the head of navigation. The commerce of Ouachita river and its tributaries is considerable and consists of shipments of cotton, cottonseed, lumber, staves, saw logs, and miscellaneous articles, with return freights of general merchandise and plantation supplies. Most of the cotton is shipped to New Orleans, and large quantities of staves for export are sent to that city.

Texas.—The 25-foot ship canal from the Gulf to Port Arthur, called the Port Arthur canal, was opened in 1899, and is now in charge of the Federal Government, having been transferred to it by the canal company in 1906. The Galveston and Brazos canal, bought by the United States in 1902 of the navigation company owning it, is 29.5 miles long and has a ruling depth of 3 feet. The Government has already made estimates for a great inland waterway from the Rio Grande to the Mississippi river at Donaldsonville, La. The figures are: Aransas Pass to Pass Cavallo, $65,850; Brazos river to Galveston, $141,528.80; Franklin to Mermentau river, $289,292—a total of $496,670.80. The section Donaldsonville to Franklin is already under improvement. Another work already begun is the construction of an inland waterway along the coast. "The object of the improvement is to obtain and maintain a navigable channel depth of 5 feet in a canal along the coast of Texas, underlying the lagoons lying between the islands and the mainland. The improvement will develop a light-draft inland navigation which will afford cheap transportation by light-draft steamers and barges on the coast country of Texas. More and larger boats with auxiliary gas engines have been built to utilize the improvement. Most of the points to be reached are settlements which railways can not afford to develop, but the improvements are of greater importance to their commercial life." [1] The localities

[1] Report of the Chief of Engineers, U. S. Army, 1907, River and Harbor Improvements, Part I, page 443.

to be improved are West Galveston bay and Brazos River canal; the channel from Aransas Pass to Pass Cavallo, including the Guadalupe river to Victoria; and Turtle Cave channel and Aransas Pass to Corpus Christi. Many of the larger rivers of the state have been improved, one of the principal projects under way being the deepening and canalization of the Trinity to Dallas, 511 miles from its mouth, thus affording a navigable waterway which will almost reach the northern border of the state.

The Morris and Cummings canal is under private ownership. It extends from Corpus Christi bay to Aransas bay, a distance of 9 miles, and has a depth of from 6.5 to 10 feet.

WESTERN DIVISION.

Washington.—Eighty miles of the Columbia river are under improvement, between Wenatchee and Bridgeport, and there are plans for further improving parts of the Okanogan and the Pend d'Oreille rivers. The county of King in 1906 voted a bond issue of $500,000 to induce the United States to join in the work of constructing a canal, with a depth of 25 feet at low water, connecting Puget Sound with Lake Washington. March 13, 1907, the legislature created a local assessment district and empowered it to raise money by taxation to aid in the construction, the money to be expended under the direction of the United States engineer officer. In addition to the payments for the right of way, these sums will provide $1,500,000 toward the expense of construction.

Oregon.—The Columbia river forms the boundary between Oregon and Washington in the lower 330 miles of its course. For ships crossing the bar at the mouth of the Columbia river the head of deep-sea navigation is Portland, Oreg., 12 miles up the Willamette river, which empties into the Columbia river 98 miles from its mouth. Vancouver, Wash., is located on the Columbia river about 5 miles above the mouth of the Willamette river, and channel dredging has furnished low-water navigation to that city for ships drawing 20 feet of water. At the Cascades, 160 miles from its mouth, where the Columbia river passes through the Cascade mountains, it is contracted into the narrow width of a gorge with steep slope and swift current. The improvement at this place by the Federal Government resulted in the construction of 2 locks, with a low-water depth of 8 feet over the miter sills, which were opened to navigation in 1896 and enabled vessels drawing not more than 8 feet of water to proceed up the river to The Dalles, about 210 miles from the mouth. From the foot of The Dalles rapids to Celilo falls, 12 miles upstream, navigation is completely obstructed by reason of the gorged condition of the channel, obstructing rocks, and powerful currents and eddies. The accepted project for the improvement of this stretch of the river provides for the construction of a canal about 8.5 miles long, 65 feet wide on bottom, and 8 feet deep, with locks 300 feet long and 45 feet wide, at an estimated cost of about $4,000,000. Construction work for this undertaking has been commenced, and when the work is completed through navigation will be possible for light-draft boats to beyond Lewiston, Idaho, 149 miles above the mouth of the Snake river, a tributary of the Columbia river. A portage railroad was built and is now operated by the state around the falls and rapids, between The Dalles and Celilo.

The Willamette River canal at Oregon City belongs to the Portland General Electric Company, is about 3,500 feet long, and connects the upper and lower river, heretofore made impassable by falls.

California.—From 1875 to June 30, 1907, the Federal Government expended $878,749 in improving the Sacramento and Feather rivers. The former is navigable from Sacramento to Red Bluff, 262 miles. The Feather river is navigable for gasoline boats and launches from its junction with the Sacramento to Marysville. The San Joaquin river is also being improved. At high water boats go occasionally to Firebaugh, 300 river miles above Stockton. A canal is to be cut to divert the waters of the Mormon channel into the Calaveras river, but the city of Stockton must furnish the right of way. The canalization of the Sacramento and the San Joaquin is suggested as part of a plan to furnish an inland waterway from the upper to the lower part of the state.

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